REVISION OF THE AUSTRALIAN FLAT BUGS OF THE SUBFAMILY MEZIRINAE (INSECTA: HEMIPTERA: ARADIDAE)

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The taxonomy of the Australian Mezirinae is revised and keys are given to the 22 genera and 91 species recognised. Related apterous genera from New Caledonia and New Zealand are included in the keys. Known Australian distribution records for all species are mapped. New genera proposed are *Corynophlaeobia, Mesophloeobia* and *Granulaptera*. *Artabanellus* is synonymised under *Caecicoris*; *Dimorphacantha* is synonymised under *Scironocoris*; *Scirrhocoris* is synonymised under *Neophloeobia*; *Micromezira* is synonymised under *Carventus* and is shown to belong to the Carventinae, not the Mezirinae. The following new species are described: *Neuroctenus transitus, N. occidentalis, N. woodwardi, N. kapalga, N. yorkensis, Ctenoneurus meridianalis, C. robertsi, Scironocoris australis, Chinessa claudiae, C. pusilla, Chiastoplonia bamaga, C. granulata, C. thoracica, Corynophloeobia dimorpha, Glochocoris gippslandicus, Arbanatus peninsularis, A. tropicus, A. frazieri, Arictus dimidiatus, A. obscurus, Drakiessa cantrelli, D. glaebula, D. consobrina, D. planula, D. wasselli, D. virago, D. sybilae, D. arelimira, Chelonoderus forfex, C. thompsoni, C. minor, Aegisocoris kormilevi, Neophloeobia bulburina, N. incisa, N. paluma, N. cataracta, N. elongata, Mesophloeobia vetusta, M. kirrama, M. yeatesi, Granulaptera verrucosa, G. ovata, G. remota, G. alticola, G. cooki, G. spiniceps*. The following species are synonymised (senior synonym given first): *Neuroctenus proximus = N. majusculus; Artabanus bilobiceps = A. australis; Caecicoris microcerus = Artabanellus infuscatus; Brachyrhynchus australis = B. scrupulosus; Carventus brachypterus = Micromezira australis*. The following non-Australian species of *Dimorphacantha* are transferred to *Scironocoris: sexspinosus, distinctus, luchti, usingeri, brachypterus, borneensis, armatus*. New generic combinations are proposed for the following Australian species (previous genus in parentheses): *Usingerida roberti* (*Mezira*); *Neophloeobia australiensis* (*Scirrhocoris*); *N. mirabilis* (*Scirrhocoris*), *Mesophloeobia australica* (*Neophloeobia*); *Granulaptera tuberculata* (*Neophloeobia*); *Brachyrhynchus wilsoni* (*Mezira*). Lectotypes are selected for *Neuroctenus proximus, Chinessa bispiniceps* and *Brachyrhynchus australis*. The following genera and species are newly recorded from Australia: *Arbanatus, Neuroctenus crassicornis, N. par, N. eurycephalus, Artabanus sinuatus, Chinessa bispiniceps, C. iniqua, Chiastoplonia pygmaea, Arictus lobuliventris, Brachyrhynchus subtriangulus*. Most Australian species are closely associated with rainforest tracts along the eastern seaboard of the continent. Patterns of diversity are examined with maxima occurring at Iron Range in Cape York Peninsula (30 spp.), in the Wet Tropics Zone around Cairns (42 spp.) and in the Border Ranges between Queensland and NSW (18 spp.). At Iron Range the fauna is dominated by winged species allied to the New Guinea fauna. In the other areas of high diversity wingless species with endemic and Melanesian Arc affinities predominate. ☐ *Hemiptera, Aradidae, Mezirinae, Australia, Pacific, taxonomy, biogeography, rainforests.*

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CONTENTS

The Aradidae is a large family of heteropterous sucking bugs which share the features of 2-segmented tarsi, 4 segmented antennae, stylets elongated and withdrawn into a coil inside the enlarged clypeus when not in use, and connexival areas of the abdomen broadly exposed around the perimeter of the small-sized hemelytra (when present). The stylets are used to tap juices of fungal hyphae in dead and dying wood. Typical species are flattened to live under loose bark of dead trees and logs. This leads to the common names of 'flat bugs' or 'bark bugs'.

A feature of the family is the propensity to wing loss, particularly in ground habitats in rainforest environments. This wing loss has occurred on separate occasions many times throughout the taxonomic and geographic components of the family. These wingless aradids become highly modified and include some of the most bizarre-shaped insects known. They are also extremely cryptic in nature and consequently rare in collections. Monteith (1969, 1982) discussed the evolutionary and ecological significance of this wing loss.

The higher classification of the family has remained relatively stable since the masterly world revision of Usinger & Matsuda (1959). They recognised 8 subfamilies which have remained unchanged despite study of new characters such as the labrum (Stys, 1969), the stylets (Lee & Pendergrast, 1976) and the pretarsus (Vásárhelyi, 1986). Australia and New Zealand are the only land masses on which all 8 subfamilies live.

The Mezirinae is the largest subfamily by far, comprising more species worldwide than all the other subfamilies combined. It is also the most evolutionarily advanced as shown by the cladistic analysis of Vásárhelyi (1987) and Jacobs (1980). When Kormilev & Froeschner (1987) catalogued the world fauna they listed 124 genera and 1075 species which they pointed out was an increase of 277% in species in the 28 years since Usinger

& Matsuda's monograph. This increase was almost entirely due to the work of Nicholas A. Kormilev.

The Mezirinae are easily recognisable using Usinger & Matsuda's key to subfamilies. They share the open metathoracic scent gland orifice, usually enlarged genae, abdominal glabrous area pattern of 2:2:1 and lack surface incrustation on the body.

HISTORY OF COLLECTION AND STUDY OF AUSTRALIAN MEZIRINAE

The present study brings the known fauna of Australian Mezirinae to 91 species in 22 genera. This is based on comprehensive modern collections and it is useful to speculate on how complete our knowledge of the total fauna now is (Fig. 1).

The earliest known specimens are those undated ones of *Neuroctenus proximus* from 'King George Sound' and of *Brachyrhynchus australis* from 'Australia' which were in the British Museum prior to their publication in Walker (1873) which is the earliest publication to mention Australian species. By the end of the nineteenth century only 8 species had been collected. In the first 15 years of the 20th century another 12 species were collected by A.M. Lea of the South Australian Museum, H. Hacker from the Queensland Museum and Eric Mjöberg of the Rijksmuseum in Stockholm. These were some of the earliest collectors in the rainforests of north Queensland. Over the next 40 years 10 more Australian species were collected until 1963 when I began to collect Aradidae as a specialist group. The very steep rise in the curve (Fig. 1) indicates that more than 50 additional species were revealed over the next 10 years as major rainforests were intensively sampled. Though collecting intensity has increased in more recent years the curve has flattened out to the extent that only 2 species have been discovered in the last decade, the most recent being *Drakiessa arelimira* 5 years ago. This rapid tapering off of the rate of species discovery, despite continuous collecting effort, indicates that most Australian Mezirinae are now known.

The curve for publication of these records (Fig. 1) follows a very different pattern. Following Walker (1873) and Bergroth (1896) who recorded just 3 species prior to the turn of the century no further species were published for 45 years until Usinger (1941) and Drake (1942) described two large apterous species *Chelonoderus stylatus* and *Drakiessa hackeri*, respectively, these being the first apterous species noted from the continent. The modern era began with Usinger & Matsuda's (1959) monograph of the world fauna. At about the same time N.A. Kormilev, the leading specialist on the family, began a series of papers dealing with Australian museum collections which led to another 22 species being reported. Following Kormilev's last paper dealing with Australian species in 1971 there have been no additions to the Australian mezirine fauna for 25 years until this present publication which adds 58 new taxa taking the published fauna from 33 to 91 species. This takes knowledge of the Australian fauna to the happy situation where virtually all species have probably been collected and published.

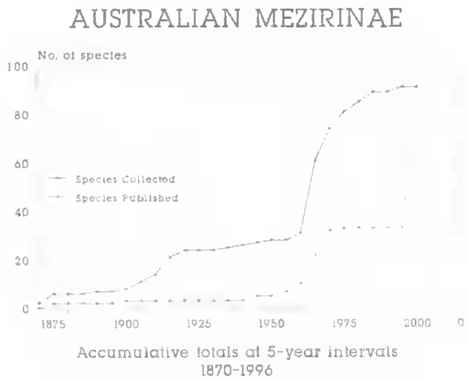

FIG. 1. Diagram showing the progressive increase in knowledge of the Australian Mezirinae since first records about 1870. The top line is based on the earliest dates of collection of each Australian species. The lower line is based on the earliest dates of publication of Australian records of each species.

STUDY MATERIAL

Aradidae, particularly the cryptic apterous species, are relatively poorly represented in museum collections and a large number of species have been described from unique specimens. The present study deals with 6424 specimens of Australian Mezirinae; despite this, *Brachyrhynchus elegans* (Kormilev) and *Arbanatus peninsularis* sp. nov. are still known only from singletons. The great bulk of this material has come from specialist field collecting by the writer and associates.

COLLECTING METHODS. The traditional method of peeling loose bark from dead trees and logs yields normal macropterous genera such as *Neuroctenus, Brachyrhynchus* and *Arictus* which are the principal mezirine components in open eucalypt forests. However, most Australian species live in the dim, damp interior of rainforests where bark peeling is of limited usefulness. Most of these rainforest species, and practically all the apterous species, live on undersides of dead wood (sticks, branches, large and small logs lying on the ground). These are collected by close inspection of these undersides. Because of their extreme camouflage and immobility a head torch is useful, even in the day time. Carrying pieces of wood to sunny patches in the forest is also of help. Since most species are gregarious the finding of one specimen on a particular piece of wood means that careful inspection usually reveals more. Often nymphs, which are less camouflaged, are detected first. Larger nymphs for which no associated adults are located can usually be reared to adults by keeping them with moist bark and wood in a plastic vial.

Extraction in a berlese funnel of leaf litter and bark frass is useful for some small species, such as *Glochocoris* and *Arbanatus*. The technique of 'stick brushing' is very effective for sampling the cryptic apterous species. Loose material adhering to the underside of wood lying on the ground is brushed with a stiff brush into a plastic bucket. This is continued until a couple of litres of material is obtained. This is then extracted in an ordinary berlese funnel.

Very small species which live in crevices and beetle burrows on the outer surface of dead standing trees and stumps (e.g., *Chiastoplonia* spp.) can be obtained by spraying the surface with household aerosol pyrethrum and collecting specimens which fall onto fabric sheets on the ground. Occasional specimens are taken in flight intercept traps, including almost all known *Ctenoneurus robertsi*.

All field specimens are collected directly into ethanol and mounted under the microscope later. Before mounting compacted soil is cleaned under ethanol from dirty specimens by loosening with a mounted needle and brushing with a small artist's camel hair brush cut off short to form stiff bristles. This cleaning is absolutely essential for most apterous species and for certain macropterous species which habitually coat themselves with soil (e.g., *Glochocoris* spp.).

A systematic attempt has been made to sample all significant rainforest tracts in Australia. Darlington's (1960) list of his rainforest collecting localities has been useful in this respect. Only the monsoon forest patches in the Kimberley region of WA have not been included in the survey.

BORROWED MUSEUM COLLECTIONS. Australian Mezirinae were borrowed from the following institutions to which I am most grateful. They are listed with their abbreviation used in the text and the curators with whom I dealt: ANIC, Australian National Insect Collection, Canberra (M.S. Upton, T.A. Weir); AM, Australian Museum, Sydney (C.N. Smithers, G.A. Holloway, G. Cassis); BCRI, Biological and Chemical Research Institute, Sydney (C.E. Chadwick, M.J. Fletcher); BPBM, Bernice P. Bishop Museum, Honolulu (G. Nishida); BMNH, The Natural History Museum, London (W.R. Dolling); CAS, Californian Academy of Sciences, San Francisco (P.H. Arnaud); DJ, D. Jacobs collection, Pretoria; DSIR, Department of Scientific and Industrial Research, Auckland (L. Deitz); EH, Ernst Heiss collection, Innsbruck; HNHM, Hungarian Natural History Museum, Budapest (T. Vásárhelyi); HUB, Humboldt University of Berlin, Berlin (U. Gollner-Scheiding); MCG, Museo Civico, Genoa (R. Poggi); MDPI, Department of Primary Industries, Mareeba (R.I. Storey); MM, Macleay Museum, University of Sydney (H.S. Horning); MNHG, Natural History Museum, Geneva (D. Burckhardt); NMB, Naturhistorisches Museum, Basle (W. Wittmer); NMNH, National Museum of Natural History, Washington (R. Froeschner); NRS, Naturhistoriska Riksmuseet, Stockholm (P.I. Persson); NTM, Northern Territory Museum (M.B. Malipatil, G. Brown); QDPI, Queensland Department of Primary Industries, Brisbane (J.F. Donaldson); QM, Queensland Museum, Brisbane; SAM, South Australian Museum, Adelaide (G.F. Gross); TAD, Tasmanian Agriculture Department, Hobart (M. Williams); TMAG, Tasmanian Museum and Art Gallery, Hobart (A. Green); UQIC, University of Queensland Insect Collection (M. Schneider); UZMH, Universitetets Zoologiska Museum, Helsinki (M. Meinander); WADA, Western Australia Department of Agriculture, Perth (K. Richards); WAM, Western Australian Museum, Perth (T.F. Houston).

LISTS OF MATERIAL EXAMINED. To give the maximum amount of information with economy of space the following standard procedures are followed in each species account.

A separate entry is given for the TYPE in which full label data is given for the primary type specimen/s, together with location, registration number, whether examined and nomenclatural procedures such as lectotype selection.

All other specimens are summarised under 'Materials Examined'. An initial statement gives the total number of specimens. Generally with new species all specimens are made paratypes and this is indicated in that statement. In a few species variant specimens are excluded from paratyping and these are listed at the end as 'the following specimens are not paratypes'. Specimens are listed by Australian state and since most are from coastal Queensland this state is divided into North Queensland (north of Bowen), Central Queensland (Gladstone to Bowen) and South Queensland (south of Gladstone). Within each region the localities are listed from north to south as far as practicable. Specimen data is listed in the sequence: locality, number of specimens, date, collectors name, museum deposition. The locality name is not repeated for separate collections at the same locality and the museum deposition is only entered when it changes from the last citation. Thus the entry: 'Brisbane 2?1/, 12.ii.1984, BKC, 4/, 26.ix.1993, GBM (in QM), 5/1?, 13.vi.1994, DJC (in ANIC)' indicates 3 separate collections from Brisbane of which the first two are in the Queensland Museum and the third is in the Australian National Insect Collection. Material of species being described as new is listed in this manner. For common (>100 specimens), widespread described species localities and museum locations only are given. QM registration numbers for paratypes being lodged there are given at the end of each 'Material Examined' list.

The majority of original specimens studied are in the Queensland Museum, Brisbane, often in long series with identical data. Duplicates from these series have been lodged in museum collections around the world as recorded at the end of each 'Material Examined' list. An almost complete collection of Australian Mezirinae is now housed in the Natural History Museum, London.

Common collectors' names, and other terms, are abbreviated as follows: AC, A. Calder; ANZSES, Australian and New Zealand Scientific Exploration Society; BKC, B.K. Cantrell; DJC, D.J. Cook; DKY, D.K. Yeates; EW, Earthwatch; GBM, G.B. Monteith; GIT, G.I. Thompson; HAH, H. & A. Howden; HJ, H. Janetzki; JFL, J.F. Lawrence; JH, J. Hasenpusch; JS, J. Seymour; LR, L. Roberts; NP, National Park; RIS, R.I. Storey; RS, R. Sheridan; SJP, S. & J. Peck; SH, S. Hamlet; SF, State Forest; SRM, S.R. Monteith; TAW, T.A. Weir.

MEASUREMENTS. Aradidae are variable, and often asymmetrical, insects. Precise measurements are generally not useful in taxonomy though relative proportions of some body parts are. For these reasons the amount of measurements presented is moderate. For each species the primary type has been measured plus a large and small specimen of each sex where available. This is designed to give the size range, rather than any statistical mean which is not a useful concept. The standard series of measurements with the abbreviations used in the text are: L, total length from apex of head to tip of abdomen; W, width across widest part of abdomen; HL, head length from anterior tip of head to front margin of prothorax; HW, head width across the eyes; PL, median length of pronotum; PW, maximum width of pronotum; AS (I-IV), length of antennal segments from the basal segment (I) to the apical (IV); SL, median length of scutellum; SW, maximum width of scutellum; WL, wing length; CL, length of the corium. Wing, corium and scutellum measurements are not taken for apterous species.

BIOLOGY OF AUSTRALIAN MEZIRINAE

The biology of the Aradidae was reviewed by Usinger & Matsuda (1959). Their life style is a rather sedentary existence in association with fungal decay of dead wood. Long periods are spent feeding with the elongate stylets inserted into the wood. Camouflage is a necessary adjunct to this behaviour and protects them during this enforced immobility.

Macropterous and apterous Mezirinae live in Australia (Fig. 2) and so far as is known all except termitophilous *Aspisocoris* live in association with dead wood.

The basic division in biology is between those that live in the compressed space beneath loose bark (subcortical) and those that live on the outside of the bark. The subcortical environment is a temporary one, existing only for the period after the bark becomes loose and before it is completely shed (Monteith, 1969). It is also a spatially discontinuous habitat and there may be a considerable dispersal required from one log to another with suitable loose bark. The subcortical environment is typical of open forest where direct sunlight and desiccation cause bark to shrink and loosen. In rainforest, bark on dead wood usually stays moist and persistent, decaying slowly as the wood decays. Higher humidity enables Aradidae to live on the outside of the bark in rainforest, particularly on the underside of logs and sticks

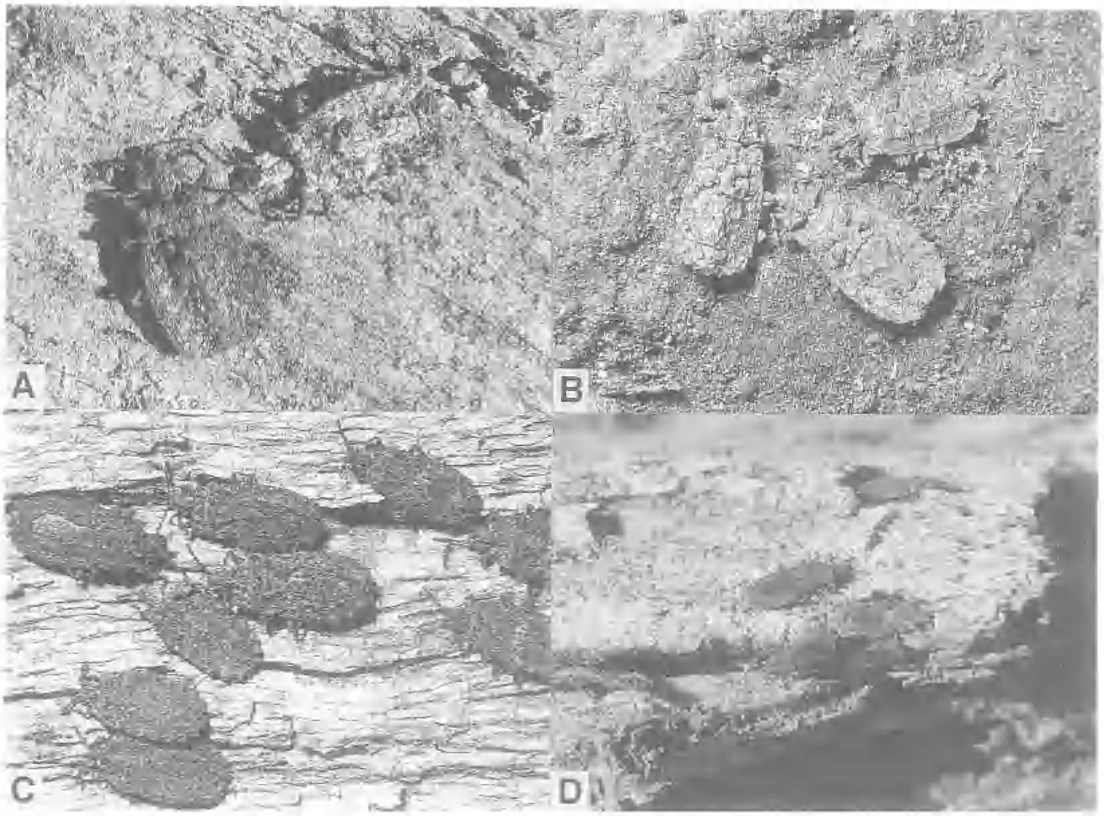

FIG. 2. Living examples of Australian Mezirinae. A, ♂ (right) and ♀ of *Drakiessa hackeri*, Australia's largest species. B, ♀ (lower right) and 2 ♂ of *Drakiessa confusa*. C, Six adults (top) and 3 nymphs of *Arictus monteithi*. D, Adults of *Neuroctenus woodwardi*. A and B are wingless species which live on undersides of dead wood on the ground. C and D are typical winged species which live under loose bark on dead logs and trees.

lying on the ground. This habitat is abundant and semi-continuous on twigs, sticks and logs in and on the moist litter of rainforests. Thus long dispersals to new food sources are not necessary in this environment.

The implications of these habitat differences to the biology of Mezirinae are:

1) Open forest species are flattened, subcortical, winged species with good dispersal powers and hence most are rather widespread. They lay large numbers of eggs and go through their life cycle rapidly, building up large colonies to exploit their temporary habitat. Most open forest species of *Brachyrhynchus*, *Neuroctenus* (Fig. 2D) and *Arictus* (Fig. 2C) fall into this category.

2) Rainforest species tend to be less flattened (sometimes highly convex) and live on the outer surface of the bark. They occur in small colonies which may persist for a number of years on a single log. Eggs produced are few, large and are not deposited in batches. Individuals are long lived and colonies usually consist of overlapping generations of all nymphal stages. Habitat longevity and spatial continuity means that there is little or no need for dispersal flights. Thus many species have lost wings entirely (*Neophloeobia*, *Drakiessa*, etc.), others are macropterous but cement their wings down with accumulated debris early in adult life (*Chinessa*, *Glochocoris*, *Chiastoplonia*, etc.), while a very few compromise by maintaining wing dimorphism (*Caecicoris*, *Usingerida*). Lack of dispersal power means that many rainforest species have small geographic ranges.

Naturally there are exceptions to these generalized categories but they are relatively few in number. There are some normal subcortical species in rainforest (some *Neuroctenus*, *Arictus*, *Ctenoneurus*). There are a few litter-inhabiting species in open forest (*Glochocoris brisbanicus*, *Brachyrhynchus wilsoni*), and there are occasional apterous species in open forests (*Drakiessa*

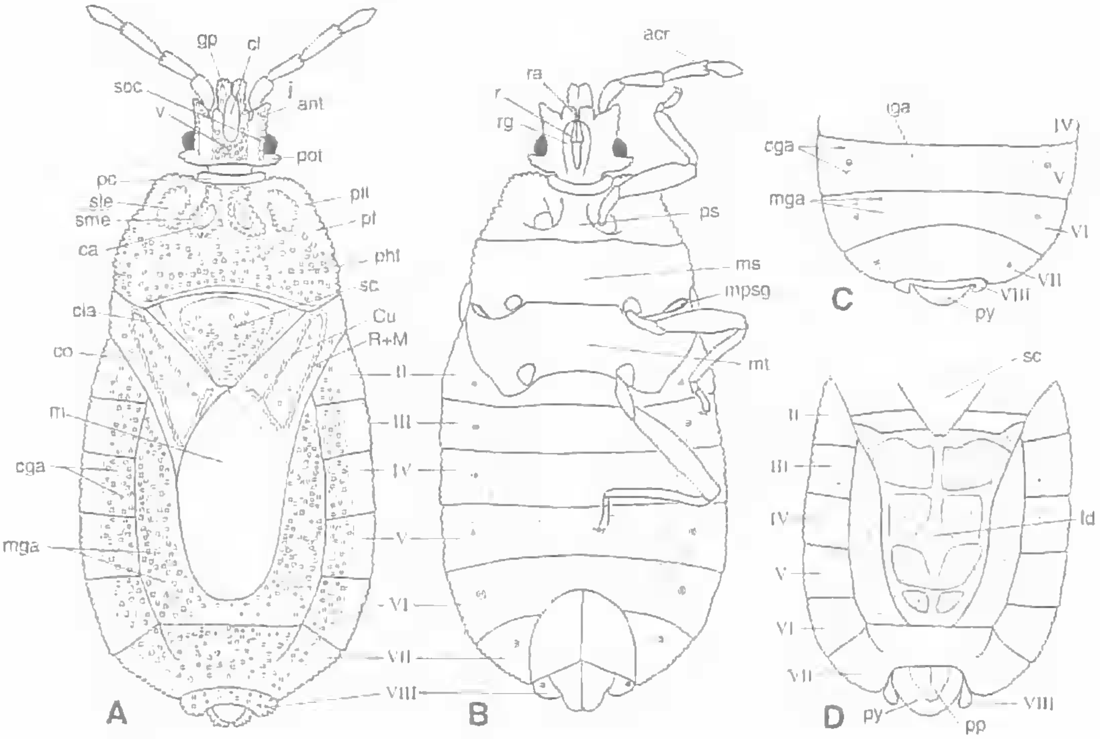

FIG. 3. *Brachyrhynchus australis*, morphology. A, ♀ dorsal view; B, ventral; C, ♂ ventral abdomen; D, ♂ dorsal abdomen with wings removed. Abbreviations: II-VII=connexiva of abdominal segments 2-7; VIII=paratergites of segment 8; acr=antennal crenulations; ant=antenniferous tubercle; ca=callus; cga=connexival glabrous areas; cl=clypeus; cla=clavus; co=corium; Cu=vein Cu; gp=genal process; iga=inner glabrous areas; j=jugum; m=hemelytral membranes; mpsg=metapleural scent gland; mga=midlateral glabrous areas; ms=mesosternum; mt=metasternum; pc=pronotal collar; pf=pronotal furrow; pfl=pronotal fore lobe; phl=pronotal hind lobe; pot=postocular tubercle; pp=posterior parandria; ps=prosternum; py=pygophore; r=rostrum; ra=rostral atrium; rg=rostral groove; R+M=veins R+M; sc=scutellum; sle=sublateral elevations; sme=submedian elevations; soc=supra-ocular carina; td=tergal disk; v=vertex.

hackeri). Wing condition, habitat preference and vegetation affiliation are recorded for all Australian Mezirinae in Figs 69 & 70.

Often a considerable number of species coexist in the one rainforest tract. There does not seem to be any species association with wood from particular host tree species. However there is a decided preference by aradid species for timber of different size and decay state, and this may reflect associations with specific fungal species. Rough categories of Australian rainforest Mezirinae in terms of their association with wood of different decay states are as follows:

1) Newly fallen timber. Includes fallen wood, less than about a year old, in which the bark has not begun to decay on the underside and many separate smaller branches and twigs on the forest floor. Associated aradids tend to be less sedentary species. (*Neophloeobia*, *Mesophloeobia*, *Granulaptera*, *Caecicoris*, *Usingerida*).

2) Intermediate aged timber. Includes small and large logs with most bark intact but decayed on the underside to provide many small cracks and crevices. Associated aradids are the more sedentary and often convex species which lead a camouflaged life resting in cavities (*Aegisocoris*, *Chelonoderus*, *Chinessa*, *Scironocoris*).

3) Old rotted timber. Includes large old logs and remnants of old logs which have lost all bark and are decayed on underside into large crevices and cavities. Two distinct groups inhabiting this situation are large apterous species heavily camouflaged with detritus (*Drakiessa* spp.), and very

small winged species which form large colonies (*Glochocoris, Chiastoplonia, Clavicornia*).

MORPHOLOGY

Morphology of the Aradidae is treated by Usinger & Matsuda (1959) while others with useful general discussions are Jacobs (1986), Picchi (1977) and Stys (1974). Other works with significant components devoted to the Mezirinae include Wygodzinsky (1948) on Neotropical species, Lee & Pendergrast (1976) on New Zealand species and Kumar (1967) on internal anatomy of Australian species. The excellent illustrations in the publications of Ernst Heiss, e.g., Heiss 1989b, contribute much to our knowledge of aradid morphology.

The present treatment aims to describe characters and terminology used in the subsequent keys and descriptions. Some sections have been expanded where potential exists for wider taxonomic application. As a basis for discussion comprehensive labelled diagrams of a typical macropterous species, *Brachyrhynchus australis*, are provided (Fig. 3).

Head. The head is generally short and broad so that median length and width across the eyes are subequal. The head margin behind the eyes may be variously produced into post-ocular tubercles which are commonly flattened, angulate projections (Fig. 3A), but may be cylindrical (Figs 34B, 60), backwardly-directed lobes (Fig. 24A), reduced to narrow strips (Fig. 37A), or entirely absent (Figs 47B, 27A, 20G). Sometimes a secondary pair of tubercles is developed posterior to the true postocular tubercles (Fig. 42). The eyes are small, usually rather exserted (Fig. 3A) and may be mounted on stylate bases (Fig. 42). Immediately anterior to the eyes are the antenniferous tubercles which may be separated from the eyes by deep clefts (Figs 42, 41), especially in apterous species. The antenniferous tubercles may be strongly divergent (Fig. 61D) or subparallel (Fig. 57), and may have acute (Fig. 61B) or blunt (Fig. 40H) apices; sometimes they are greatly reduced (Fig. 27A). A median anterior projection of the head consists of the enlarged clypeus, which houses the coiled stylets when retracted. On each side of the base of the clypeus are the juga (mandibular plates) (Fig. 3A) which never approach the clypeal apex in Mezirinae; by contrast the genae are almost invariably enlarged and usually surpass the clypeal apex to form a bilobed (Fig. 3A), or even strongly bifid (Figs 24H, 61B), apex to the head. In a few cases both clypeus and genal processes are greatly reduced, bringing the antennal bases closely approximate (Figs 27A, 27E). The vertex is usually elevated to the same level as the clypeus and bears granules or small tubercles (Fig. 3A) which may be arranged in longitudinal rows (Fig. 34B).

The antennae are 4-segmented, with, in Australian species, all segments of the same order of length. Segments II, III and IV usually have petiolate bases (Fig. 57) which may be absent on II and IV (Fig. 3). In *Brachyrhynchus* (Fig. 37C) and *Arictus* (Fig. 34C) the apices of segments II and III are crenulate. In the termitophilous *Aspisocoris*, segments III and IV are fused (Fig. 18) but with suture indistinctly visible. Antennal vestiture is generally inconspicuous but may be long and dense (Fig. 42).

The rostrum is 4-segmented and, in length, rarely exceeds the hind margin of the head (Fig. 32B). It arises from a subapical rostral atrium which is usually narrow and slit-like (closed) (Figs 3B, 12I), but which may rarely be open, fully exposing the insertion point of the rostrum (Fig. 32B). The rostrum normally lies in a rostral groove on the ventral side of the head, margined by rostral carinae; the groove may be closed posteriorly by joining of the rostral carinae (Fig. 12I) or may be open (Fig. 12J). Very infrequently the rostral groove and carinae may be obliterated (Fig. 12K).

Thorax. The pronotum, in macropterous species, is divided into a fore lobe and a larger hind lobe by a transverse discontinuity which often forms a furrow (Fig. 3A). In its generalised form the fore lobe is divided into 4 low elevations: a pair in the middle of the pronotum, lying one on each side of the midline and here termed the submedian elevations, and a pair lying between them and the lateral margins and here termed the sublateral elevations. Each submedian elevation is usually formed around a smooth disc, termed the pronotal callus. These elevations of the fore lobe are variably developed. The submedian areas may be obliterated (Fig. 19), the sublateral ones may be lost (Fig. 20C), or all four may be absent, as in *Neuroctenus* (Fig. 12B). The pronotal hind lobe is conspicuous in macropterous species but completely lost in apterous genera. In brachypterous species (Fig. 19) and in the brachypterous morphs of dimorphic species (Figs 20G, 22A), the hind lobe is reduced to a narrow, transverse band smaller than the fore lobe.

The scutellum is triangular in macropterous and brachypterous species, usually with margins thickened and carinate. The basal angles often

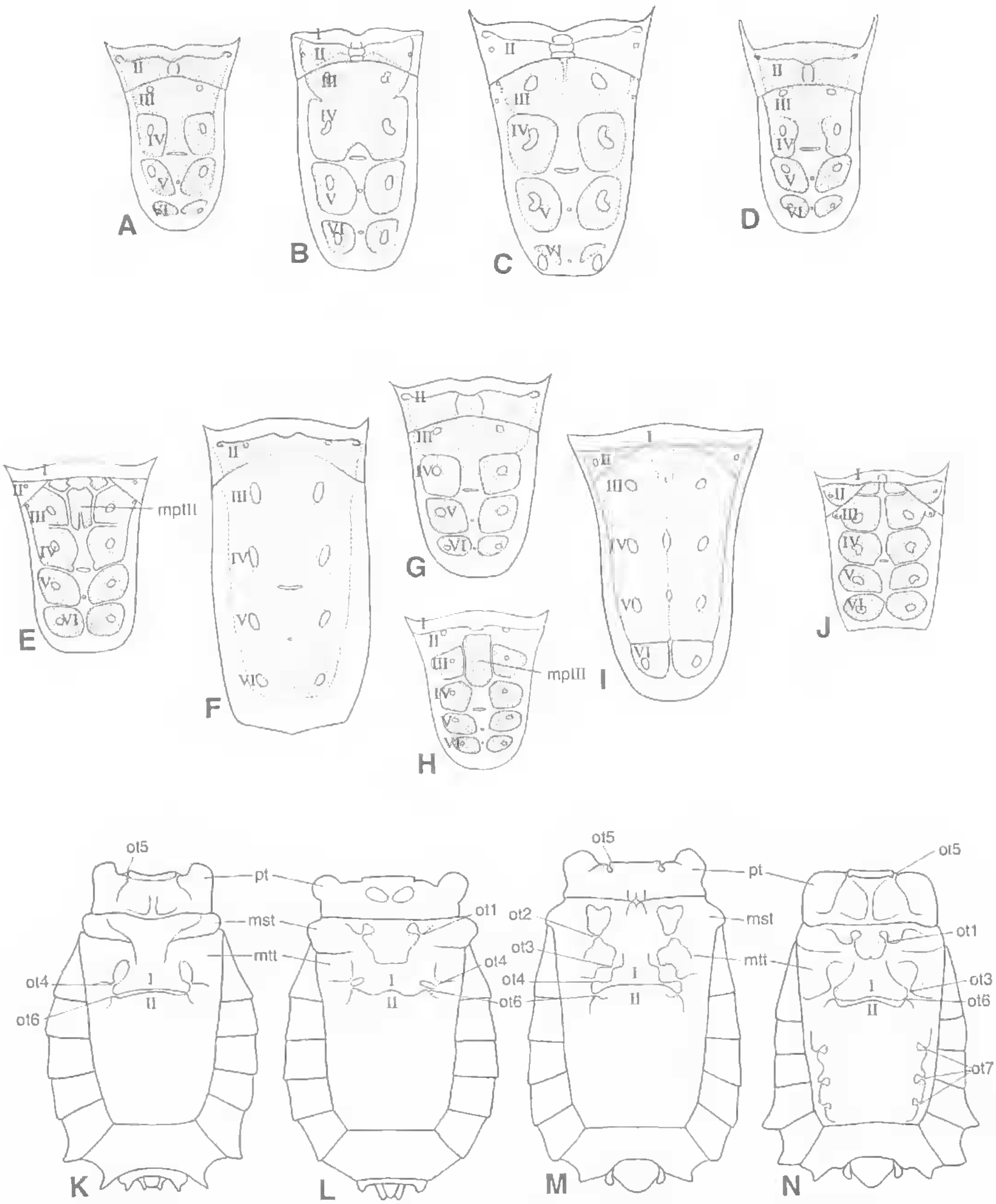

FIG. 4. Mezirinae dorsal surfaces. A-J, tergal discs of winged species with wings removed. A, *Neuroctenus yorkensis*; B, *N. crassicornis*; C, *N. proximus*; D, *Ctenoneurus australis*; E, *Artabanus bilobiceps*; F, *Arbanatus frazieri*; G, *Chinessa bispiniceps*; H, *Usingerida roberti*; I, *Arictus monteithi*; J, *Caecicoris microcerus*. K-N, thorax and abdomen of wingless genera. K, *Neophloeobia elongata*; L, *Aegisocoris kormilevi*; M, *Drakiessa wasselli*; N, *Chelonoderus minor*. Abbreviations: I-VI=abdominal segments 1-6; mpIII=median plate of segment 3; mst=mesothorax; mtt=metathorax; ot1, ot2, ot3, ot4, ot5, ot6, ot7=opposable tubercles at positions noted in text; pt=prothorax.

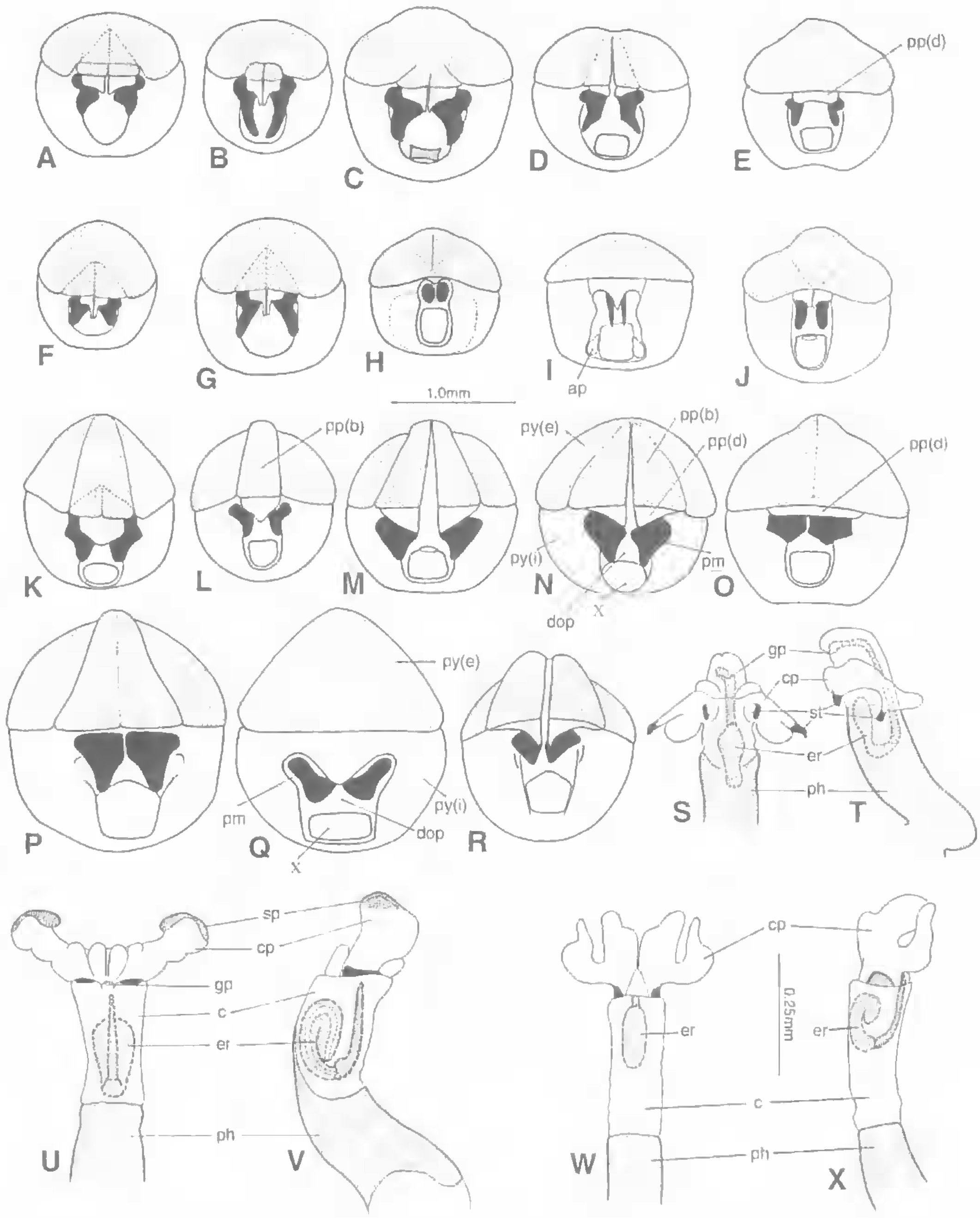

FIG. 5. A-R, dorsal views of pygophores. A, *Neuroctenus woodwardi*; B, *N. occidentalis*; C, *N. grandis*; D, *N. par*; E, *N. crassicornis*; F, *N. yorkensis*; G, *N. eurycephalus*; H, *Ctenoneurus australis*; I, *Artabanus bilobiceps*; J, *Scironocoris australis*; K, *Usingerida roberti*; L, *Chinessa bispiniceps*; M, *Arbanatus frazieri*; N, *Arictus monteithi*; O, *Brachyrhynchus sulcatus*; P, *B. australis*; Q, *Aegisocoris granulatus*; R, *Granulaptera ovata*. S-X, expanded aedeagi, ventral and lateral views. S-T, *Neuroctenus crassicornis*; U-V, *Mesophloeobia australica*; W-X, *Drakiessa consobrina*. Abbreviations: ap=anterior parandria; c=conjunctiva; cp=conjunctival process; er=ejaculatory reservoir; dop=dorsal opening of pygophore; gp=gonopore; ph=phallotheca; py(e)=exposed portion of pygophore; py(i)=internal portion of pygophore; pm=paramere; pp(b)=basal part of posterior parandria; pp(d)=distal part of posterior parandria; sp=spinules; st=sclerotised teeth; X=abdominal segment 10.

have small teeth overlapping the hind pronotal margin (Fig. 12B), or the middle of the anterior margin may be broadly produced likewise (Figs 20A, 27E, 34A). The midline of the scutellar disc may have a single longitudinal ridge (Fig. 20C), a triradiate ridge (Fig. 27A), or a distinct cross (Fig. 32F). In apterous species the scutellum becomes completely fused with surrounding sclerites but is normally still recognisable as an elevation in the centre of the mesonotum.

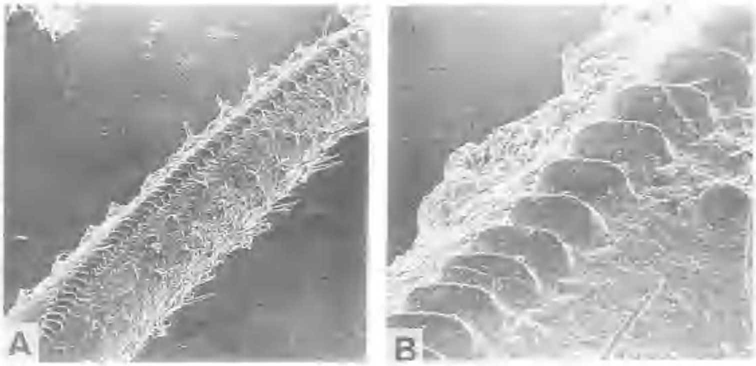

FIG. 6. *Artabanus bilobiceps*. A, SEM of stridulatory file on the hind tibia. B, Detail of teeth of same.

The hemelytra of macropters rarely reach beyond the hind margin of abdominal segment VI, and are usually a little longer in males than in females. Coria may be well developed, reaching well beyond apex of scutellum, in which case two prominent longitudinal veins are present, R + M and Cu (Figs 3A, 20A). In some genera the coria are very abbreviated, often without veins present (Figs 29A, 27C). The term 'Brachypterous' is applied to species with normal scutellum and with hemelytra reduced to movable vestiges which may be the entire original corium (Figs 19, 22A), or only a tiny vestige thereof (Fig. 20G). 'Apterous' species lack a defined scutellum and have wing vestiges either entirely absent, or as small rigid tubercles which become fixed as part of the thoracic ornamentation.

The mesonotum and metanotum become highly modified in the apterous species, with much of the original segmentation obscured by development of a complex secondary pattern of tubercles, ridges, pits and furrows. A recurring phenomenon of this secondary modification is the pairs of tubercles which project towards each other with their apices adjacent but not touching (Fig. 4K-N). These may occur on the dorsum of the head, thorax and abdomen and can be shown to be homologous within and between certain genera; consequently they are of considerable value in classification. Since they do not appear to have been noted *per se* previously I propose the term 'opposable tubercles' for them. Their function and significance are unknown; they occur only in apterous species, always in pairs, and almost invariably on opposite sides of a suture. The last observation suggests that they may have some function as strengthening devices preventing flexing of the body wall along the sutures. This would aid in 'crush proofing' these insects which live on the underside of wood lying on the ground where they are vulnerable to being squashed as the wood is moved about on the forest floor by animal foraging and rain run-off.

Some of the species with best development of these tubercles are those which normally carry a thick soil layer (e.g., *Drakiessa* spp.); possibly the tubercles are also for enhancement of the capacity to hold a soil layer. Distribution of opposable tubercles in four Australian apterous genera is shown in Figs 4K-N.

Legs. The femora bear conspicuous ventral spines in *Scironocoris* (Fig. 20J) and *Artabanus* (Figs 16L, 16M), while the hind tibiae bear a stridulatory row of fine teeth in *Artabanus* (Figs 6A-B, 16L).

The pretarsal structures of Aradidae have potential in taxonomy but have been little employed. Basically there are two pairs of processes, in addition to the claws, on the aradid pretarsus: a pair of fine bristles arising from the unguitractor plate between the bases of the claws, and a pair of larger lobes arising one beneath each claw and attached to it. There has been confusion over terminology of these structures. Myers & China (1928) called them 'pseudarolia' and 'arolia' respectively; Usinger & Matsuda (1959) used 'median bristles' for the appendages of the unguitractor plate and Kormilev followed this in his many papers. Cobben (1968), Goel & Schaefer (1970) and Shuh (1976) established the nomenclature 'parempodia' and 'pulvilli', respectively, for the 2 types of structures and this has been applied across the aradid subfamilies (Vásárhely, 1986; Fig. 7). The range of structures indicate future usefulness for higher classification within the subfamily.

Abdomen. The abdomen has 6 segments fully developed in dorsal view (II-VII), all of which

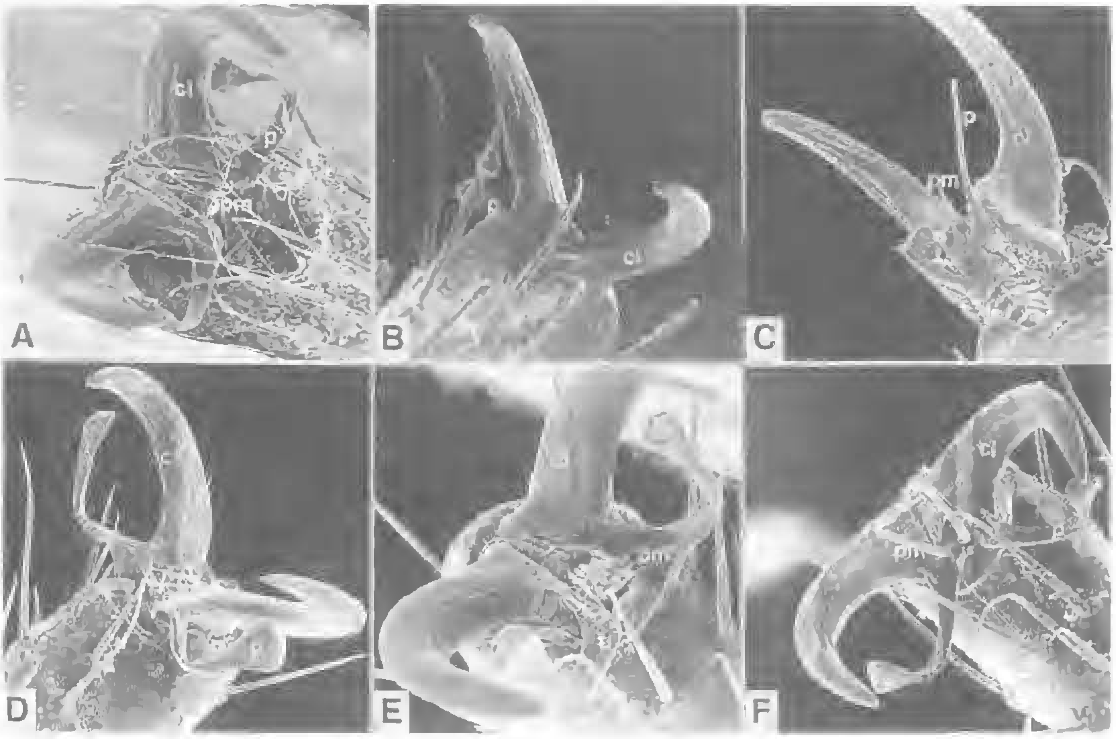

FIG 7. SEMs of pretarsal structures of Australian Mezirinae. A, *Usingerida roberti*. B, *Arictus monteithi*. C, *Artabanus bilobiceps*. D, *Ctenoneurus australis*. E, *Neuroctenus grandis*. F, *Neophloeobia montrouzieri*. Abbreviations: cl=tarsal claw; p=pulvillus; pm=parempodia.

have connexival plates cut off laterally by dorsal and ventral connexival sutures which run longitudinally along the body. The margins of the connexiva, particularly of VI and VII, are frequently lobed (Fig. 47J) or angled (Fig. 47L) and their precise shape is of great value in identification at the specific level. The abdominal terga and sterna bear small, smooth discs which Usinger & Matsuda (1959) termed glabrous areas and which Stys (1974) showed are points of muscle insertions on the cuticle. The Mezirinae have 2 connexival glabrous areas on each connexivum, 2 midlateral glabrous areas placed immediately mesal of the connexival sutures, and a single inner glabrous area on each side of the midline of each of abdominal segments III-VI (Fig. 3A-D).

While the segmentation of the connexiva is clearly marked, except for occasional fusion of II and III (Fig. 16A), the median regions of the abdominal terga preceding VII are invariably fused to a greater or lesser extent into a rigid tergal disc. Normally the wings, at rest, cover only the middle of the tergal disc (Fig. 3A), leaving the midlateral glabrous areas exposed. But in a group of very small genera (*Clavicornia*, *Chiastoplonia*, *Glochocoris*, *Arbanatus*, *Corynophloeobia*) the wings cover the whole tergal disc (Figs 27A, 27F). The portion of the tergal disc concealed beneath the wings is always flat, smooth and glabrous. But when the tergal disc is exposed, either partially as in most macropterous species or wholly as in apterous forms the exposed portion becomes rugose, pitted and often setose. In some apterous genera this becomes extreme, with secondary patterns of ridges formed, or even gross convexity of the whole tergal disc as in *Aegisocoris* (Fig. 51D) and *Pseudoargocoris* (Fig. 51A).

In cleared preparations the central tergal disc of macropterous species shows a very distinct pattern of glabrous areas, segmental punctured discs, and sutures which varies enormously from species to species. Usinger & Matsuda (1959) drew attention to the potential usefulness of this feature in the Mezirinae and figured tergal discs in 15 representative genera. However, they admit that a general phylogenetic picture is not yet evident. Hsiao (1964) figured the tergal discs of a number of Chinese *Mezira* species. I figure here 8 genera and 11 species from the Australian fauna to enlarge the available data on this useful character (Figs 3D, 4A-J). The most generalised pattern is seen in *Caecicoris* which has the inner discs of segments II-VI completely separate; variable amounts of fusion occur in other genera with virtually no sutures in *Arictus* and *Arbanatus*; partial fusion of III and IV seems characteristic of *Neuroctenus*, *Ctenoneurus* and *Chinessa*. Separation of a median plate between the lateral discs of segment III occurs in *Artabanus* and *Usingerida* (Figs 4E, 4H) as well as in *Odontonotus* (Usinger & Matsuda, 1959). Perhaps the most basic dichotomy is between those genera with the suture between II and III continuous and forming the functional anterior margin to the fused tergal disc (e.g., *Neuroctenus*, *Ctenoneurus* and *Chinessa*), and those in which the I/II suture becomes the functional suture so that all or part of segment II is incorporated in the fused tergal disc (e.g., *Brachyrhynchus*, *Arictus*, *Artabanus*). In Australian apterous genera the condition of the tergal disc agrees with the latter group and this is taken as partial evidence of their evolution from a *Brachyrhynchus*-like ancestor.

Spiracles in the Mezirinae are normally present on abdominal segments II-VIII and are usually situated on the ventral side, far from the margin as in *Brachyrhynchus* (Fig. 3B). Among Australian genera, *Glochocoris* is the only one with reduction in spiracle number, those of segment II being absent (Fig. 29G). Among other genera, some spiracles may move to the body margin and be visible in dorsal view (Figs 13F, 27C, 32G), but none are truly dorsal. In some apterous species which cover themselves with a thick layer of dirt the spiracles may be mounted on low tubercles, e.g., *Drakiessa glaebula* and *D. cantrelli*.

Ornamentation of the abdominal sterna is rare except in males of some genera where secondary sexual structures provide very useful characters which have been largely overlooked in the past. In *Arictus*, sternum VI bears species specific patterns of raised, smooth callosities which may incorporate the glabrous areas (Figs 34K-P). In other groups ornamentation is restricted to sternum VII. In *Glochocoris* a prominent, flattened spine is present (Figs. 24F, 24I); in the apterous *Drakiessa* (Fig 43), *Neophloeobia* (Fig. 53) and *Mesophloeobia* (Fig 58) median, unpaired, polished calli, bosses or tubercles may occur.

Male Genitalia. The male genitalia have been little used in conventional taxonomy of Aradidae. The aedeagus and parameres are contained inside the subspherical, externally visible pygophore (= 'hypopygium' of Kormilev) which is morphologically abdominal segment IX. On each side of the pygophore project the paratergites of the reduced segment VIII. These bear a spiracle and their shape is often useful in taxonomy. The pygophore is divided into a smooth, lightly sclerotised anterior portion which retracts inside segment VII at rest, and a rugose, heavily sclerotised posterior portion which remains exposed. Much of the dorsal region of the anterior portion is taken up with an opening through which the aedeagus protrudes during copulation. Visible in this opening are the vestigial tergum X bearing the anus, and the apices of the parameres. Posterior to the dorsal opening, the rim of the dorsal wall of the pygophore is divided into a pair of triangular plates which are variously modified. The nomenclature and homology of these plates is a matter of considerable contention. One trend has been to call them styli, without necessarily accepting that they are true gonopods of segment IX (Usinger & Matsuda, 1959; Lee & Pendergrast, 1977; Jacobs, 1986), though the homology of such structures with true gonopods in the Hemiptera has been argued by Matsuda (1976). The alternative is to accept Leston's (1955) proposal of parandria, a term which regards the structures as outgrowths of the pygophore wall without any primitive homology, and this course has been adopted by Monteith (1966) and Schaefer (1977) and will be followed here.

The best development of parandria in the Aradidae is in the chinamyersiines *Kumaressa* and *Tretocoris*, with 2 large pairs, called by Monteith (1966) the anterior parandria and the posterior parandria. The anterior parandria are equivalent to what Usinger & Matsuda (1959) call the subtriangular plates, and similar differentiated regions of the pygophore wall have been noted in *Ctenoneurus* and *Woodwardiessa* (Lee & Pendergrast, 1977). The only case noted in the present study where the anterior parandria are distinct, semi-mobile sclerites is in *Artabanus* (Fig. 5I). Only the posterior parandria are generally developed in the Mezirinae. Lee & Pendergrast (1977) commented on their division into basal and distal portions in *Woodwardiessa quadrata*, although their figures of *Ctenoneurus* species showed similar divisions. This subdivision of the posterior parandria is here shown to be a widespread phenomenon in the subfamily.

To illustrate the range of variability and the potential taxonomic use of parandrial development the pygophores of 11 genera and 18 Australian species are shown (Figs 5A-R). The generalized condition appears in *Brachy-*

rhynchus (Figs 5M-N) where the parandria are divided for their full length and have triangular, membranous, distal appendices which fit under the margin of tergum VII at rest. This same pattern occurs in most Australian apterous genera (e.g., *Granulaptera*, Fig. 5R). In other groups various degrees of fusion take place. The basal portions may fuse but still retain a median suture (Figs 5O, 5P); the parandria may be greatly reduced (Figs 5B-C) or completely eliminated (Figs 5E, 5I, 5Q); the distal appendices may fuse into a single flap (Figs 5E, 5O, 5K, 5L); separate mobile areas may be cut off by secondary sutures (Figs 5A, 5K). A distinctive development is seen in some species of the related group comprising *Neuroctenus*, *Ctenoneurus* and *Chinessa* where the lateral walls of the pygophore grow inwards, eliminating the basal portions of the parandria (Figs 5H, 5J).

Parameres in this subfamily are generally flattened or conchoid and lack the complex hooks and processes which make them so useful in many other groups of Hemiptera. A feature of potential taxonomic use is the band of short ridges which occurs down the inner posterior margin of parameres of *Brachyrhynchus* (Figs 37I-L). It has also been noted in the Neotropical *Dysodius* (Heiss, 1990). This structure has the appearance of a stridulatory mechanism but since no corresponding plectrum can be located this seems unlikely. The inner face of each paramere bears against the valves of the female ovipositor which are partially thrust into the pygophore during copulation; conceivably the band of ridges enhances the grip between male and female. The same band of ridges occurs on parameres of all members of the complex of fully apterous genera in Australia as well as on the New Zealand *Woodwardiessa* and the New Caledonian *Phloeobia*.

Artificial inflation of the aedeagus in the Aradidae is very difficult and opportunities for studying the inflated organ rely largely on collecting copulating pairs. Aedeagi of Mezirinae have been figured by Usinger & Matsuda (1959) for *Arictus*, *Mezira* and *Ctenoneurus*, by Monteith (1969a), for *Caecicoris*, by Lee & Pendergrast (1977) for *Ctenoneurus* and *Woodwardiessa*, and herein (Fig. 5S-X)for *Mesophloeobia*, *Drakiessa* and *Neuroctenus*. No patterns are yet discernible in the subfamily due to the paucity of material. *Neuroctenus* agrees with its relative *Ctenoneurus* in having sclerotised teeth on some of the conjunctival processes. Similarly, *Woodwardiessa* and *Mesophloeobia* each have patches of spinules on the conjunctival processes.

Female spermathecae in the Aradidae have been reviewed by Lee & Pendergrast (1983) though they saw only *Ctenoneurus*, *Woodwardiessa* and *Mezira* among the Mezirinae. Kumar (1967) examined the organ in *Neuroctenus*, *Drakiessa*, *Arictus*, *Neophloeobia*, *Mesophloeobia* and *Brachyrhynchus*. A further 40 species in 11 genera are figured herein. The spermatheca in this subfamily conforms to the conventional pentatomoid type in having a subspherical bulb and a pump region with both distal and proximal pump flanges. These confirm the general uniformity of structure of the bulb and pump region in the subfamily. The only major deviation is in *Artabanus* (Fig. 20E) where the proximal pump flange has prominent teeth. However, the duct connecting the bulb to the vaginal wall shows a considerable range of modifications, some of which have classifactory value. The simplest situation is where the duct is short, membranous and not dilated (Figs 47E, 58N); this type is found in most apterous genera and in some macropterous genera such as *Arictus* (Fig. 34Q). Frequently the duct becomes dilated into a large or small sac (Figs 44g, 58O) which may become heavily sclerotised (Figs 24R, 54Q) or more rarely have internal valve-like ridges (Fig. 44b). In *Usingerida* the duct is dilated, sclerotised, and bent into a rigid U-shape (Fig. 24R). Often the point where the duct enters the vagina is strengthened by a short sclerotised ring around the duct (Fig. 44e) and in *Chinessa* this sclerotization extends a considerable distance along the duct (Figs 24K, 24L).

A remarkable situation is seen in *Granulaptera* where the spermathecal duct is very long, thin, coiled and enters the vagina via a large hollow, sclerotised bursa, formed from the vaginal wall rather than the duct itself (Figs 63G-L); the oval bursa rests transversely across the vagina with the spermathecal duct entering it consistently from the right-hand side.

In *Neuroctenus woodwardi*, Kumar (1967), using the name *N. proximus*, recorded a lateral, membranous, sac-like diverticulum to the spermathecal duct which he called an accessory gland. This is now seen to be characteristic of *Neuroctenus* (Fig. 12L-N). Lee & Pendergrast (1977, 1983) noted a similar condition in all 3 New Zealand species of related *Ctenoneurus*, however, the one Australian species studied here (*Ctenoneurus australis*, Fig. 16I) apparently lacks the diverticulum. The only other mezirine where a diverticulum was noted is *Caecicoris microcerus* (Fig. 20I) but in this case it is rigid and sclerotised.

GENERIC CLASSIFICATION

The genera of Mezirinae have increased from 83 to 125 since Usinger & Matsuda's (1959) monograph. However there is no tribal classification to enable any subdivision of genera and the resolution of this problem is one of the outstanding needs among modern Hemiptera studies. The 22 genera recorded from Australia herein (Figs 8-10) are a small proportion of the world total comprising less than half the approximately 60 genera from the Oriental-Pacific region. Furthermore, the Australian genera by no means form a monophyletic group, but clearly have several origins in time and space. For these reasons a consideration of interrelationships among Australian genera must perforce be superficial. One group of Australian genera, however, do appear to have evolved on the continent as a single endemic unit. These are the 7 fully apterous genera which include almost half the Australian species.

MACROPTEROUS AND BRACHYPTEROUS GENERA. This category includes the first 15 genera in the systematic accounts which follow. The classification adopted here for them is essentially that of Usinger & Matsuda (1959) but the names of 4 generic taxa used by them have changed. Three of these involve the synonymy of generic names erected by Usinger & Matsuda with those of previously described genera of which species were unavailable to them during their review. These are *Dimorphacantha*, *Zeugocoris* and *Pictinellus* which have gone to synonymy of *Scironocoris*, *Caecicoris* and *Arbanatus*, respectively. The fourth is Mezira which has been subdivided by Kormilev & Froeschner (1987) such that the Australian taxa attributed to it by Usinger & Matsuda are now placed in *Brachyrhynchus*. Two Australian genera have been described since Usinger & Matsuda, viz. *Aspisocoris* Kormilev and *Corynophloeobia* gen. nov., both monotypic endemics.

All recognised Australian genera, with the exception of *Aspisocoris* and *Corynophloeobia*, are included in the generic keys of Usinger & Matsuda (1959). Kormilev (1971) gives a key to the Oriental-Pacific genera which also includes all the Australian winged taxa except *Corynophloeobia* although 5 (*Caecicoris*, *Scironocoris*, *Usingerida*, *Chinessa* and *Arbanatus*) were not known from Australia at that stage. Kormilev's is basically the same key as that developed by Usinger & Matsuda, and the generic key in the present work follows the same pattern with inclusion of all taxa and slight modification.

The 15 genera in this section can be divided into the following groups for discussion:

Group A: *Neuroctenus*, *Ctenoneurus*, *Chinessa*. The first two genera are closely related, with some non-Australian intermediate forms. They share transverse ridges on the abdominal sterna and almost invariably a large lateral diverticulum to the spermathecal duct. *Chinessa* lacks both these features but is placed with these 2 genera because all 3 have a very characteristic form of inner tergal disc in which terga II and III are separated by a continuous suture. Non-Australian genera which belong here include *Overlaetiella* (Africa-S.E. Asia) and *Hoberlandtiella* (Africa).

Group B: *Aspisocoris*. This unique, brachypterous genus is endemic to SW Australia. Its many modifications for termitophily obscure its relationships but it may be allied to *Ctenoneurus* in Group A.

Group C: *Clavicornia*, *Chiastoplonia*, *Corynophloeobia*, *Glochocoris*, *Arbanatus*. These genera form the Australian component of a large Oriental-Pacific group which has very small body size coupled with large wings which cover the mid-lateral portion of the tergal disc. Non-Australian genera allied to them include *Aphelocoris*, *Dolichothyreus* and *Acoryphocoris* from the Indo-Pacific, and the African *Usingeria*.

Group D: *Brachyrhynchus*, *Arictus*, unspecialized genera which share reduction of tarsal pulvilli. *Daulocoris* and *Kema*, both from S.E. Asia are related. The many species placed in *Mezira* are also allied though *Mezira* continues to be a taxonomic dumping ground.

Group E: *Artabanus*, *Caecicoris*, *Scironocoris* and *Usingerida*. These genera are members of a loosely defined group of Indo-Pacific genera with strong tendencies to brachypterism and its associated modifications which obscure relationships. Most lack postocular tubercles and have teeth on fore margin of the scutellum. Related genera include *Mastigocoris* and *Phanocoris*.

APTEROUS GENERA. The generic classification of the apterous species has required considerable modification in the present work which treats 40 Australian species. Prior to the present study only 13 of these apterous species were known in 6 genera, 3 of them monotypic, placed by 4 different authors in 7 publications stretching over 26 years. This necessarily fragmentary approach to the discovery and classification of Australian species, and particularly the fact that only 4 species were known to Usinger & Matsuda (1959) has meant that the generic classification has developed in an ad hoc manner with consequent lack of definition and stability.

Classification of apterous species is fraught with many difficulties. The obviously polyphyletic nature of the apterous condition has been stressed (Usinger, 1950; Usinger & Matsuda, 1959) but we are still unable to recognize monophyletic groups of genera with confidence in either geographic or taxonomic terms. Furthermore, it is rare that macropterous, ancestral taxa can be recognized for groups of apterous species. The remarkable change in appearance which accompanies loss of wing function, even in different morphs of the same species (Monteith, 1969) means that phenetic divergence from the winged ancestor is rapid once obligate aptery is achieved.

The Australian species form a close knit group which is entirely absent from New Guinea and other northern land masses, but which is represented in New Caledonia by monotypic *Phloeobia* (Fig. 10D), and in New Zealand by the more primitive monotypic genus *Woodwardiessa* (Fig. 10D). Together, this group of 9 genera shares a number of characters which could delineate a tribal group. These features, with exceptions shown mostly by *Woodwardiessa*, are as follows:

1) Head broad, with well-developed antenniferous tubercles, genal processes and, except *Chelonoderus*, postocular tubercles.

2) Antennae inserted closer to base than to apex of antenniferous tubercles.

3) First antennal segment short, rarely surpassing apex of clypeus (except *Woodwardiessa*).

4) Eyes small, globular, and usually exserted.

5) Rostrum short, not exceeding length of rostral groove.

6) Rostral atrium closed (open in *Woodwardiessa*).

7) Pronotum transverse, its width more than 1.5 times length.

8) Hind lobe of pronotum absent (narrow remnant present in *Woodwardiessa* and *Mesophloeobia kirrama*).

9) Margins of scutellum fused with adjacent sclerites (incomplete in *Woodwardiessa*).

10) Pretarsal pulvilli spatulate.

11) Trochanters not fused with femora.

12) Connexiva II and III separate.

13) Spiracles present on abdominal segment II.

14) Spiracles of II-VII all ventral (those of VII lateral in *Woodwardiessa* and *Mesophloeobia kirrama*).

15) Fused abdominal tergal disc incorporating segments II-VI.

16) Male pygophore with posterior parandria present as triangular lobes separated by a median suture.

17) Male parameres with a band of short ridges running along the posterior edge of the inner face.

Apterous genera from other southern land masses may be allied to these wingless Australian genera. For example, *Emydocoris* Usinger from Brazil is superficially similar to *Drakiessa*, and the Madagascan *Robertiessa* Hoberlandt, 1963, is remarkably like *Granulaptera*. But lack of specimens for comparison precludes a decision in this matter. If there are close relatives in these other southern continents then this group of genera joins the growing list of insect taxa showing disjunct trans-antarctic distributions. This is quite in accord with the belief that the Australian forms arose in the wet forests of the Tertiary which predate dismemberment of Gondwanaland.

The macropterous ancestor or ancestors of this complex of species appear to have been *Mezira*-like. Since this endemic apterous fauna clearly evolved in the mesic forests which were widespread in the Tertiary before the Australian plate made contact with the northern land masses its ancestor needs to be sought among those macropterous taxa with similarly old, autochthonous elements present. Of those genera present today only *Brachyrhynchus*, *Neuroctenus* and *Ctenoneurus* are possible candidates; all other Australian genera appear to be recent northern immigrants. Of these 3 genera, both *Neuroctenus* and *Ctenoneurus* appear ineligible because of their tergal discs which do not include tergum II, and their spermathecae with accessory glands. On the other hand, *Brachyrhynchus*, as exemplified by the southern endemics, *Brachyrhynchus australis* and *B. wilsoni*, agrees with the apterous complex in most features listed above. In particular the sharing of the band of ridges on the parameres, a distinctive character occurring rarely in the Mezirinae, provides a strong link. The only significant inconsistency is the lack of spatulate pretarsal pulvilli in *Brachyrhynchus*, and if *Brachyrhynchus* is indeed the progenitor of the apterous complex, then their absence in modern species must be a derived state.

The grouping of the 40 Australian species into the 7 genera recognized in this study was carried out by intuitive assessment of their characters in

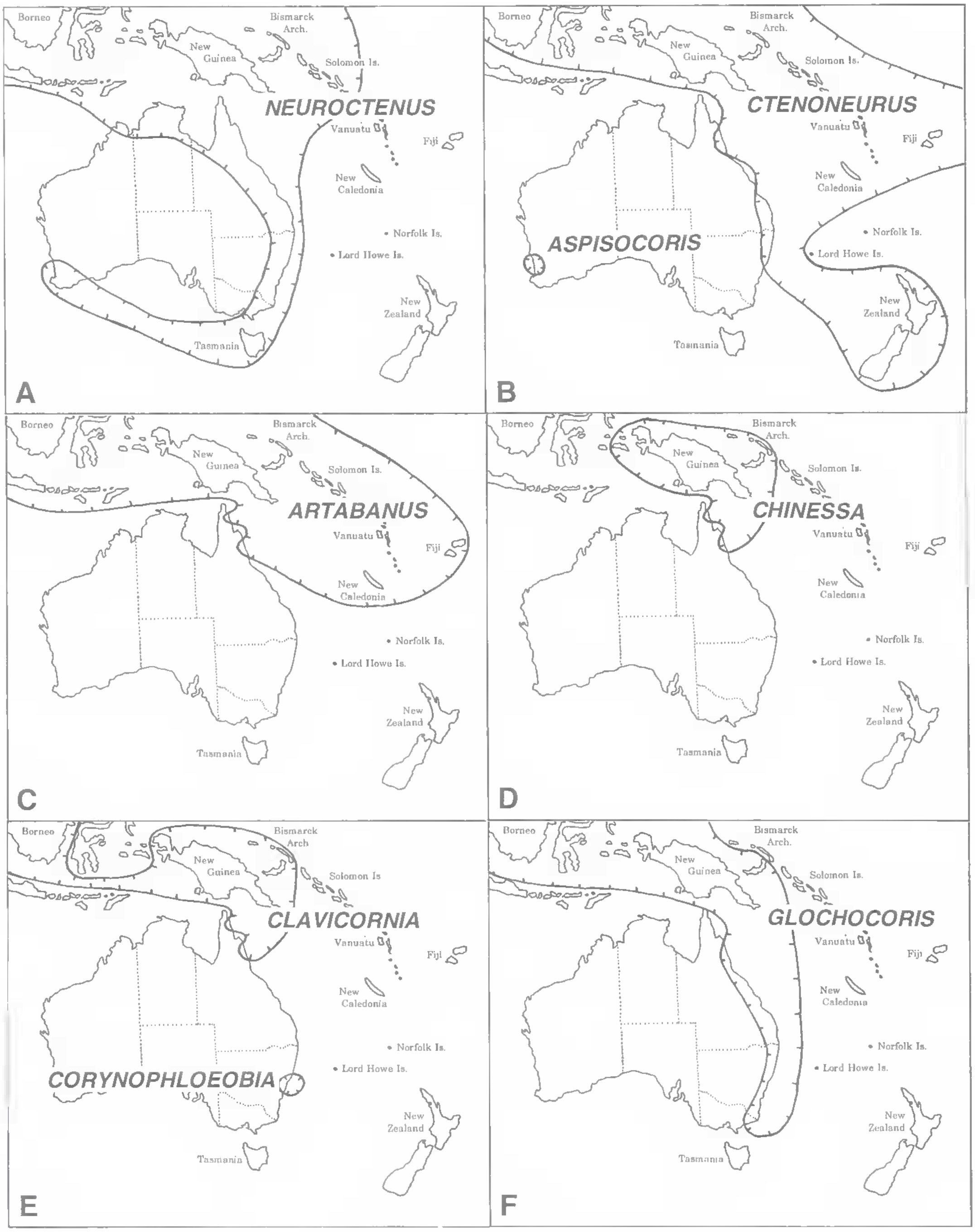

FIG. 8. Range of Australian mezirine genera in Australia and adjacent land masses. A, *Neuroctenus.* B, *Ctenoneurus* and *Aspisocoris.* C, *Artabanus.* D, *Chinessa.* E, *Clavicornia* and *Corynophloeobia.* F, *Glochocoris.*

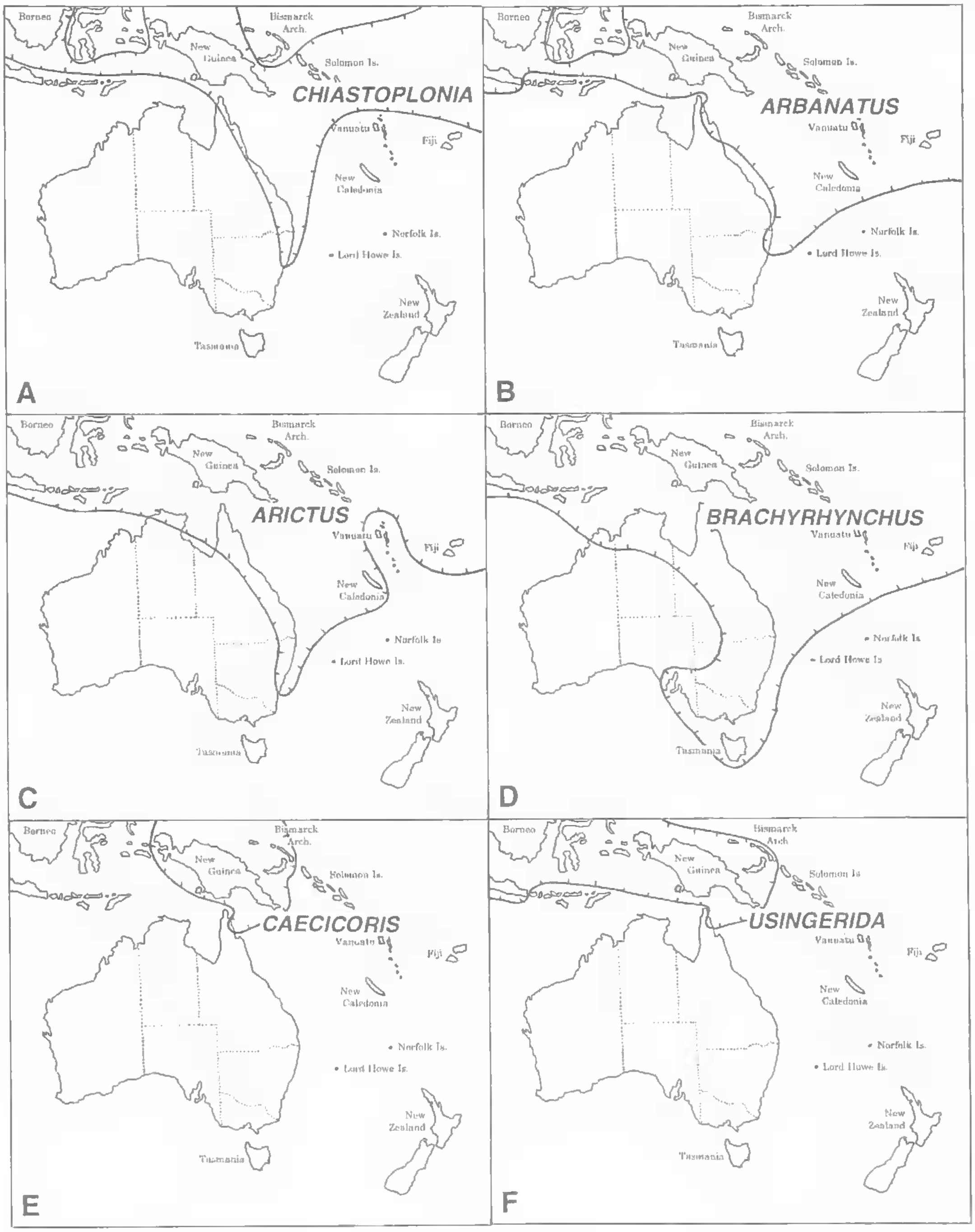

FIG. 9. Range of Australian mezirine genera in Australia and adjacent land masses. A, *Chiastoplonia*. B, *Arbanatus*. C, *Arictus*. D, *Brachyrhynchus*. E, *Caecicoris*. F, *Usingerida*.

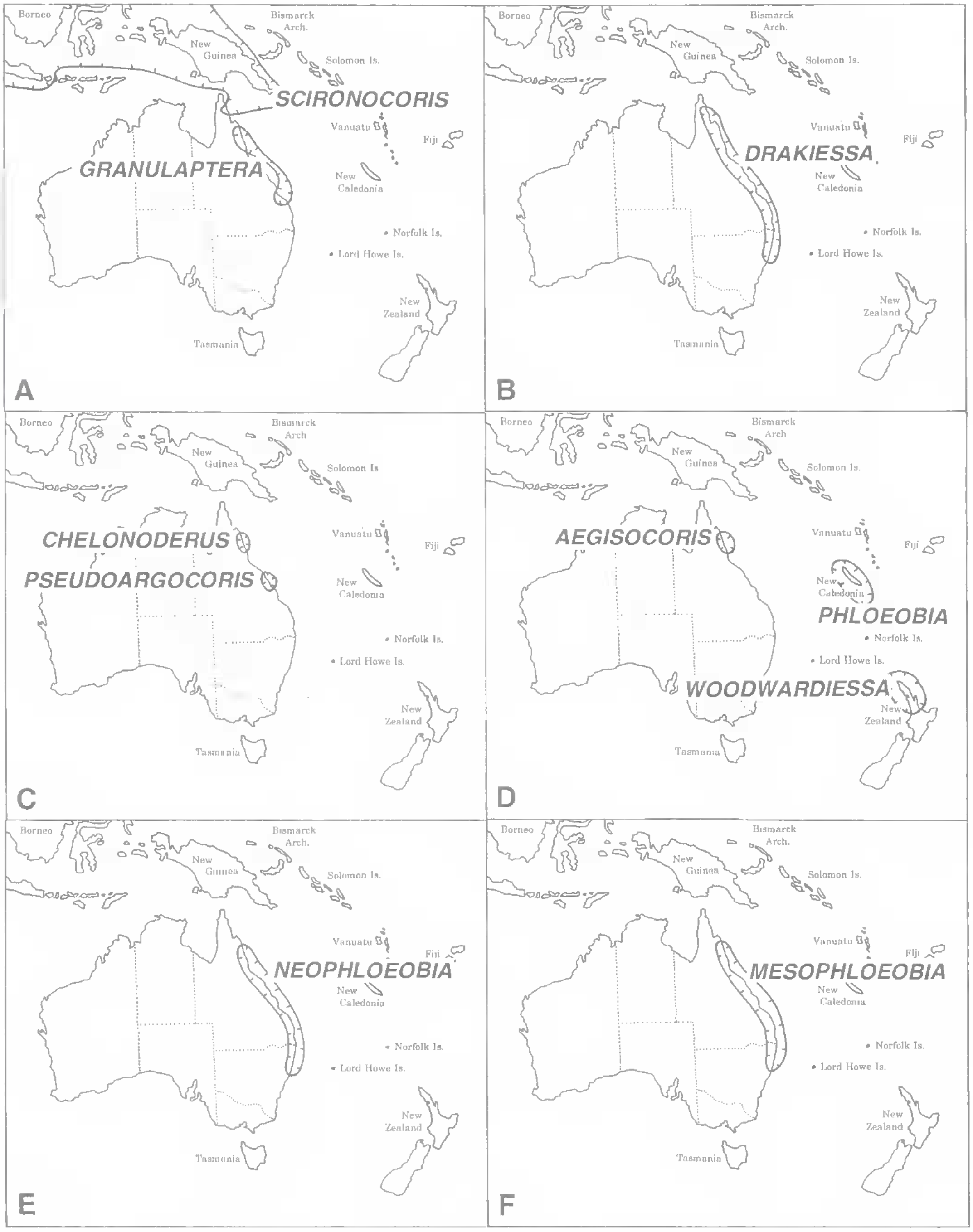

FIG. 10. Range of Australian and flightless New Zealand and New Caledonian genera of Mezirinae in Australia and adjacent land masses. A, *Scironocoris* and *Granulaptera*. B, *Drakiessa*. C, *Chelonoderus* and *Pseudoargocoris*. D, *Aegisocoris*, *Phloeobia* and *Woodwardiessa*. E, *Neophloeobia*. F, *Mesophloeobia*.

conjunction with study of *Phloeobia sayi* Montrouzier, from New Caledonia, and *Woodwardiessa quadrata* Usinger & Matsuda, from New Zealand.

Woodwardiessa, by virtue of its distinct scutellum and large wing vestiges, stands out as the most primitive member of the group and its presence in New Zealand must be regarded as relictual. The remainder fall into two discrete groups, the more generalized ones without dorsal opposable tubercles (*Mesophloeobia*, *Granulaptera*), and those with thoracic and/or abdominal terga variously elaborated into pairs of tubercles (*Drakiessa*, *Neophloeobia*, *Aegisocoris*, *Pseudoargocoris*, *Chelonoderus* and *Phloeobia*).

The 3 species placed in *Mesophloeobia* share the retention of a complete suture between terga I and II, and this, coupled with their simple prothorax and their widespread but relictual distribution makes them closest to a winged ancestor of any Australian species. *Granulaptera* is a well defined group characterized largely by the distinctive spermathecal bursa.

The patterns of dorsal opposable tubercles are very constant, clearly homologous from species to species, and have proved extremely useful in defining the remaining 5 genera. Three basic configurations of tubercles occur (Fig. 4K-N).

1) *Neophloeobia*-pattern (Fig. 4K). This is the simplest type with opposable tubercles on the pronotal collar (ot5) and on each side of the abdominal terga I and II (ot4 and ot6). Tubercles homologous with the latter 2 pairs occur as part of the configuration of the remaining genera.

2)*Chelonoderus*/*Aegisocoris*/*Pseudoargocoris*-pattern (Fig. 4L, 4N). This group imposes upon the basic *Neophloeobia* pattern an extra pair of tubercles on each side of the scutellar elevation (ot1). Collar tubercles may (Fig. 4N) or may not (Fig. 4L) be present. In *Chelonoderus* a series of small tubercles occurs along the margin of the tergal disc (ot7).

3)*Drakiessa*-pattern (Fig. 4M). This type includes collar tubercles (ot5) and the basic *Neophloeobia* tubercles (ot4 and ot6), with the addition of an extra pair between the metanotal elevation and abdominal tergum I (0t3) and an extra pair between the meso- and metanotal elevations (ot2). *Drakiessa* species show the greatest development of tubercles and some may have additional pairs developed between the pronotum and mesonotum.

New Caledonian *Phloeobia* has only 2 insignificant pairs of tubercles between terga I and II present (ot6). However its extremely smooth, flat dorsal surface is atypical and may reflect different selective pressures which have caused virtual elimination of its original pattern. *Phloeobia* is difficult to place in the context of the Australian genera; it has the facies of *Drakiessa* but is more allied with the other genera with a sulcate midline to the pronotum.

Phylogeny within the Australian genera is obscure. In this respect it needs to be stressed that even though they have the appearance of a monophyletic group they may not be so in the true sense of having arisen from a single ancestor. There is growing evidence that apterous aradid faunas evolve by invasion of rainforests by numerous macropterous species many of which lose their wings due to the strong selective pressures for aptery in the rainforest environment (Monteith, 1969b). Thus the Australian apterous fauna, as we see it today, is probably the product of several instances of wing loss in several '*Mezira*-like' ancestors which invaded the wet Tertiary forests. However the genera with dorsal tubercles do seem to present a single line in which the widespread *Neophloeobia*-type with its simple tubercle configuration has given rise to 2 separate stocks with more ornate tubercle patterns, viz. *Drakiessa*, based in southern Queensland, and *Chelonoderus-Aegisocoris-Pseudoargocoris*, based in north Queensland.

KEY TO THE GENERA OF AUSTRALIAN MEZIRINAE
(Including wingless genera from New Caledonia and New Zealand)

1\. Apterous or brachypterous; wing vestiges, when present, not extending posteriorly beyond hind border of third (second visible) abdominal tergum 2
Macropterous; wings with fully developed membranes, extending posteriorly beyond hind border of fourth (third visible) abdominal tergum 14

2(1). Scutellum distinct, triangular, separated from adjacent sclerites by complete sutures; posterior lobe of pronotum usually separated off by a transverse depression; wing vestiges often present as free lobes, sometimes with reduced membranes 3
Scutellum not triangular, usually completely fused with adjacent sclerites; if separated off by posterior suture then scutellum is semi-circular; pronotum with posterior lobe absent or reduced to a narrow posterior rim; wing vestiges absent, or indistinct and immovable 6

3(2). Third and fourth antennal segments fused and rigid; metathoracic scent gland orifice obsolete; scutellum much longer than wide
. . . . *Aspisocoris* Kormilev
Third and fourth antennal segments free; metathoracic scent gland orifice present; scutellum about as long as wide 4

4(3). Rostral atrium widely open; prothorax with complex, forwardly-projecting, angular, antero-lateral lobes . . . . *Caecicoris* Kormilev (part)
Rostral atrium closed and slit-like; antero-lateral angles of prothorax rounded 5

5(4). All femora each with a prominent sub-apical ventral spine; wing vestiges obliquely truncate . . . . *Scironocoris* Kormilev (part)
Never with such spines on all femora; wing vestiges apically rounded . . . . *Usingerida* Kormilev (part)

6(2). Rostral atrium widely open; scutellum present as a semi-circular plate separated off by a continuous posterior suture; small opposable tubercles projecting inwards from the inner end of each inter-connexival suture (New Zealand) . . . . *Woodwardiessa* Usinger & Matsuda
Rostral atrium closed and slit-like; scutellum fused, not present as a discrete sclerite; inter-connexival sutures without tubercles projecting inwards . . 7

7(6). Pronotum with a median, longitudinal groove or furrow, sometimes indistinct and bordered by two rows of granules; never with opposable tubercles present between meso- and metanotal elevations 8
Pronotum without a median, longitudinal groove or furrow; opposable tubercles present between mesonotal and metanotal elevations on each side of midline of thorax . . . . *Drakiessa* Usinger & Matsuda

8(7). Opposable tubercles present between lateral elevations of mesonotum and the median scutellar ridge; submedian areas of pronotum inflated; legs never bicoloured 9
Without opposable tubercles on mesonotum; pronotum usually not inflated in submedian areas; legs usually bicoloured 11

9(8). Pronotum without sublateral elevations and with lobed antero-lateral angles; pronotal collar not distinct and without dorsal and ventral opposable tubercles; abdominal tergal disc without pairs of opposable tubercles along its lateral margins; body surface with many smooth, shining granules . . . . *Aegisocoris* Kormilev
Pronotum with sublateral elevations and without lobed antero-lateral angles; pronotal collar distinct and bearing dorsal and ventral opposable tubercles; three pairs of opposable tubercles present along lateral margins of abdominal tergal disc; body surface without shining granules 10

10(9). Head without postocular tubercles; abdominal tergal disc not greatly inflated; body form more or less elongate . . . . . *Chelonoderus* Usinger
Head with postocular tubercles; abdominal tergal disc dorsally inflated; body form ovate . . . . *Pseudoargocoris* Kormilev

11(8). Postocular tubercles triangular and blunt; pronotal collar with dorsal and ventral opposable tubercles; abdominal tergal disc with pattern of glabrous areas largely obliterated (New Caledonia) . . . . *Phloeobia* Montrouzier
Postocular tubercles cylindrical and pointed; if pronotal collar has dorsal and ventral opposable tubercles then glabrous areas of abdominal tergal disc are distinct 12

12(11). Pronotal collar not delimited by a distinct groove; surface of body with numerous smooth, shining granules; suture between abdominal terga I and II obliterated in middle; junction of spermathecal duct and vagina of female forming a large sclerotised bursa *Granulaptera* gen. nov.
Pronotal collar distinct, delimited by a furrow; body surface without numerous smooth granules; suture between abdominal terga I and II distinct in middle; spermathecal duct of female without a sclerotised bursa 13

13(12). Suture between abdominal terga I and II complete for full width; pronotal collar without opposable tubercles; without opposable tubercles between tergum I and anterior margin of tergal disc . . . . *Mesophloeobia* gen. nov.
Suture between abdominal terga I and II obliterated laterally; pronotal collar with dorsal and ventral opposable tubercles; a pair of opposable tubercles present between median plate of abdominal tergum I and anterior edge of tergal disc . . . . *Neophloeobia* Usinger & Matusda

14(1). Hind tibiae each with a stridulatory file on posterior surface which rubs against a longitudinal carina on each side of abdominal sternum IV behind hind coxae . . . . *Artabanus* Stal
Hind tibiae and abdomen without such stridulatory structures 15

15(14). Sterna of segments IV, V and VI each with a transverse carina immediately posterior to the hind margin of the preceding segment and parallel to it 16
Abdominal sterna without such transverse carinae 17

16(15). Body usually very flattened; lateral margins of abdomen more or less convex; rostrum very short, not reaching hind margin of head . . . . *Neuroctenus* Fieber
Body not very flattened; lateral margin of abdomen straight; rostrum longer, reaching anterior margin of prosternum . . . . *Ctenoneurus* Bergroth

17(15). Each femur with a prominent sub-apical, ventral spine . . . *Scironocoris* Kormilev (part)
Never with such spines on all femora 18

18(17). Midlateral glabrous areas included within the smooth glabrous tergal disc and normally hidden by wings; carinae delimiting tergal disc situated along sutures separating connexival plates; size small (3-5mm) 19
Midlateral glabrous areas located outside the carinae delimiting the smooth tergal disc and not covered by wings; size larger, rarely less than 6.0mm . . 23

19(18). Clypeus reduced, its apex not extending beyond apices of antenniferous tubercles; first antennal segments sub-contiguous at front of head . 20

Clypeus well developed, its apex surpassing level of apices of antenniferous tubercles; first antennal segments not sub-contiguous 22

20(19). Rostral atrium widely open; antennae slender . . . . *Chiastoplonia* China

Rostral atrium closed and slit-like; antennae stout 21

21(20). Spiracles of abdominal segment II present, located on lateral body margin and visible in dorsal view; spiracles of segments III-VII situated ventrally, well spaced from the body margin . . . . *Corynophloeobia* gen. nov.

Spiracles of abdominal segment II absent; spiracles of segments III-VII situated very close to body margin, those of at least segments V and VII visible in dorsal view . . . *Clavicornia Kormilev*

22(19). Spiracles of abdominal segment II (first visible) present, situated near lateral margin and usually visible from above . . *Arbanatus* Kormilev

Spiracles of abdominal segment II absent . . . . *Glochocoris* Usinger & Matsuda

23(18). Rostral atrium widely open anteriorly, postocular processes absent . . . . *Caecicoris* Kormilev (part)

Rostral atrium closed and slit-like; postocular processes in the form of lobes or tubercles . . . 24

24(23). Scutellum with a pair of broad lobes at middle of base extending forward over hind margin of pronotum; postocular tubercles of head slender, cylindrical . . . . *Arictus* Stal

Scutellum without such lobes on base; postocular tubercles usually not slender and cylindrical . . 25

25(24). Genae usually in form of long, cylindrical, divergent, usually pointed processes; postocular portion of head forming large backwardly-directed lobes; connexiva VII with prominent, angular projections . . . *Chinessa* Usinger & Matsuda

Genae short, blunt, barely surpassing clypeal apex; postocular portions of head forming narrow, sometimes angular, lobes behind eyes; connexiva VII at most with weak angulations . . 26

26(25). Apices of second and third antennal segments not crenulate; parameres of males without 'stridulatory' ridge on inner face; wing membranes roughened and without venation . . . . *Usingerida* Kormilev (part)

Apices of second and third antennal segments crenulate; inner face of parameres of males with a 'stridulatory' ridge on inner face; wing membranes usually smooth and with some veins evident . . . . *Brachyrhynchus* Laporte

Neuroctenus Fieber, 1860

Neuroctenus Fieber, 1860: 34 (descr.); Mayr, 1866: 365; Bergroth, 1887 (review of genus); Usinger & Matsuda, 1959: 198,274 (incl. in key; redescription); Matsuda & Usinger, 1957: 146 (brief description); Kormilev, 1971: 26, 62 (incl. in key; relationships); Kormilev & Froeschner, 1987: 163 (catalogue of spp.).

TYPE SPECIES. *Neuroctenus brasiliensis* Mayr, 1866 (= *Neuroctenus punctulatus* Burmeister, 1835).

DISTRIBUTION (Fig. 8A). Cosmopolitan.

REMARKS. This genus is second only to *Aradus* in number of described species. Usinger & Matsuda (1959) listed 62 species worldwide. Since then there has been a trebling to around 180 species, due largely to the work of N.A. Kormilev. More than half occur in the Oriental-Australian-Pacific region.

Neuroctenus has relationships with a group of genera which share the transverse abdominal carinae, viz. *Stelgidocoris* Usinger & Matsuda, *Hoberlandtiella* Schouteden, *Overlaetiella* Schouteden and *Ctenoneurus* Bergroth. The head-quarters for this group appears to be the African continent where all 5 genera are represented; 2 *Stelgidocoris* and *Hoberlandtiella* are restricted to Africa. *Overlaetiella* also has 2 species occurring in the Oriental-New Guinea area, while *Ctenoneurus* has 11 species in Africa-Malagasy and 21 in Oriental-Pacific. This sort of distribution pattern indicates an early origin for the group.

At the global level, species of *Neuroctenus* are rather diverse but most, including all the Australian species, share the flat form, short rostrum, trisinuate sternum VII of female and ventral abdominal carinae characteristic of the genus. There are a number of intermediate species between *Neuroctenus* and its near relative *Ctenoneurus* and these have caused some authors (e.g., Kormilev, 1971) to consider synonymising the latter. However for the vast majority of species generic assignment is unambiguous and, for the sake of convenience, I retain *Ctenoneurus* for non-flattened species.

With 13 *Neuroctenus* is second only to *Drakiessa* among Australian Aradidae in number of species. Because several species are abundant in open forest and farmlands they are the commonest aradids in collections. They have a uniformity of appearance which has led to many misidentifications in the past and consequently the nomenclature of the Australian species has been in considerable confusion. The most familiar species in eastern Australia, which has long been known as *N. proximus* Walker, has proved to be an undescribed species since examination of Walker's types of *proximus* reveals it to be the Western Australian species which has traditionally been known as *N. majusculus* of Bergroth. Several names which have been applied to Australian species (*rubrescens*, *nitidulus*, *serrulatus* and *vicinus*) by earlier writers are now shown to belong to taxa not occurring in Australia.

Eight of the 9 species endemic to Australia are open forest species without close relatives to the north. Together they comprise one of the few recognizable autochthonous elements in the Australian Aradidae which presumably evolved in parallel with the typical *Eucalyptus-Acacia* vegetation type in Australia. The 4 non-endemic species are all shared with New Guinea, all are restricted to north Queensland and all are rainforest species. They represent a recent introgression of the wet-adapted New Guinea fauna into Cape York Peninsula. *Neuroctenus* is the only aradid genus to have diversified in SW Australia where 3 endemic species occur.

Descriptive taxonomy in the genus has concentrated on size and configuration of body structures in dorsal view. But this has limited usefulness because of the great uniformity of body form imposed on *Neuroctenus* species by the pressures of their extremely constant subcortical habitat. The present study has examined the condition of some more cryptic characters including the rostral groove (Fig. 12I-K), the parameres (Fig. 12O-W) and the pygophore (Fig. 5A-G). These all show a broad range of variability and offer valuable features for species recognition. The pygophore structure, in particular, varies from the generalized condition (*N. eurycephalus*, *N. yorkensis*) where the posterior parandria are triangular, to partial fusion (*N. grandis*), to complete fusion (*N. crassicornis*), and to the unusual condition (*N. woodwardi*, *N. handschini* and *N. occidentalis*) where secondary sutures cut off mobile, apical sclerites on the parandria. Paramere structure, often of limited usefulness in the Mezirinae, is very different in some closely related species pairs of *Neuroctenus*, e.g., *N. woodwardi*/*N. handschini*.

There is a considerable degree of sexual dimorphism in the surface texture of the connexival plates in most species of *Neuroctenus*. Females generally have the surface more strongly punctate and sublateral carinae more distinct.

KEY TO THE AUSTRALIAN SPECIES OF *NEUROCTENUS*

1\. Rostral groove in form of a weak depression without lateral carinae; first antennal segment very short, its length about 1.5 times width; margins of abdomen conspicuously double and grooved; fore femora very stout, with length about 1.7 times maximum width (North Queensland) . . . . *crassicornis* Kormilev

Rostral groove with lateral carinae; first antennal segment with length at least twice width; margins of abdomen not conspicuously double; fore femora with length at least twice width 2

2(1). Hemelytral membranes transparent; paratergites of segment VIII of female short, transverse and truncate (North Queensland) . . . . *hyalinipennis* Kormilev

Hemelytral membranes dark and opaque; paratergites of segment VIII of female rounded or pointed, not truncate 3

3(2). Carinate lateral margins of rostral groove converging strongly posteriorly and coalescing or becoming subcontiguous behind apex of rostrum . . 4

Carinate lateral margins of rostral groove not converging strongly posteriorly, separate for their full length 9

4(3). Very small, less than 6.00mm; antenniferous tubercles very acute; female with paratergites of segment VIII triangular; male with suture between St VI and VII straight in middle . . . . *gracilis* Kormilev

Rarely less than 6.00mm; if so then without the above combination of characters 5

5(4). Postocular processes of head distinctly pointed; male with anterior border of St VII evenly rounded; female with paratergites of segment VIII projecting beyond apex of segment IX . 6

Postocular processes blunt; male with anterior border of St VII straight in middle and angled posteriorly at sides; female with paratergites of VIII shorter than segment IX 7

6(5). Pronotal collar distinct; spiracles of segment VIII ventral; posterior glabrous areas of Cx IV, V and VI circular; male without dorsal longitudinal carinae on Cx; length more than 7.0mm . . . . *grandis* Kormilev

Pronotal collar indistinct, spiracles of segment VIII lateral; posterior glabrous areas of Cx elongate; male with dorsal carinae present on Cx IV, V and VI; length less than 7.0mm . . . . *handschini* Kormilev

7(5). Pronotal collar indistinct; not in Cape York Peninsula 8

Pronotal collar distinct; Cape York Peninsula only . . . . *par* Bergroth

8(7). Male with longitudinal carinae present on Cx IV, V and VI; male with apices of paratergites of VIII symmetrically rounded; postocular tubercles usually moderately developed; genae not reaching beyond apex of first antennal segment (Eastern Australia and Tasmania) . . . . *woodwardi* sp.nov.
Male without longitudinal carinae on Cx IV, V and VI and with apices of VIII paratergites asymmetrically expanded on mesal side; postocular tubercles very reduced; genae reaching beyond apex of first antennal segment (Northern Territory) . . . . *kapalga* sp.nov.

9(3). Spiracles of segment VII ventral (Western Australia) 10
Spiracles of segment VII lateral, visible from above (North Queensland) 12

10(9). Antennae longer, more than 1.5 times head length; male with posterolateral angles of Cx VI protruding and margin of Cx VII sinuate . . 11
Antennae shorter, less than 1.5 times head length; male with posterolateral angles of Cx VI not protruding and margin of Cx VII simply curved . . . . *occidentalis* sp. nov.

11(10). Fore femora slender, with length more than three times width; hind femora slender, curved, reaching almost to hind margin of St IV; pygophore of male with a u-shaped impression on dorsal surface . . . . *proximus* (Walker)
Fore femora stout, with length less than three times width; hind femora stout, not curved, reaching to only about half length of St IV; pygophore of male without a U-shaped impression . . . . *transitus* sp.n.

12(9). Size larger, ♂6.00mm or more, ♀6.5mm or more; male with apical lobe of parameres long (Fig. 12T) . . . . *eurycephalus* Kormilev
Size smaller, ♂less than 6.00mm, ♀less than 6.5mm; male with apical lobe of parameres short and broad (Fig. 12S) . . . . . *yorkensis* sp. nov.

Neuroctenus gracilis Kormilev, 1965
(Figs 13E, Q)

Neuroctenus gracilis Kormilev, 1965a: 29 (descr., fig.); Kumar, 1967 (internal anatomy); Kormilev, 1971: 65 (incl. in key); Kormilev & Froeschner, 1987: 168 (listed).

TYPE. Holotype ♂, Nanango, S.E. Qld., 4.v.1964, G. Monteith, QMT6322. Examined.

MATERIAL EXAMINED. Holotrype and 8 specimens: CENTRAL QUEENSLAND: Emerald, ex eucalypt, 1 ♀, 8.vi.1976, G.K. Waite, in QDPI, 1 ♀, iii.1914, E.Allen, in BMNH; SOUTH QUEENSLAND: Carnarvon Range, 1 ♂, 6.i.1940, N.Geary, in AM; Nanango, ♀allotype, 2 ♀ paratypes, 4.v.1964, GBM; Brisbane, 1 ♀ paratype 6.iii.1949, Haseler, in QM. NEW SOUTH WALES: Warrumbungle NP, via Coonabarabran, 1 ♀, 21.xii.1973, I. Naumann, in QM. (Types: QMT26090-26093).

DESCRIPTION. Very small, 4.4-5.7mm long, with very acute antenniferous tubercles, with paratergites of VIII angulate in female. Colour dark reddish brown.

MALE. Head as wide as long; vertex finely granulate; postocular tubercles narrow, pointed, extending beyond outer profile of eyes; antenniferous tubercles with apices attenuate and acute; genal processes reaching apical 3/4 of first antennal segment. Rostrum short, not reaching level of hind border of eyes; rostral groove deep, with lateral carinae which converge together behind apex of rostrum. Antennae 1.5 times head length, segment III longest.

Pronotum with width 2.3 times length; surface uniformly and finely granulate; lateral margins straight with a narrow explanate edge to anterior two thirds; collar forming a narrow ridge set off by a groove; a faint transverse depression dividing anterior and posterior lobes; sublateral areas of fore lobe faintly inflated, remainder of surface flat. Scutellum with width 1.3 times length; posterior half with faint median ridge; surface irregularly wrinkled on anterior half, transversely wrinkled on posterior half. Hemelytra with corium reaching just beyond hind border of Cx II; membranes smoky, opaque, reaching just beyond hind border of segment VI.

Abdomen with Cx punctate and bearing faint sublateral carinae on III-VI; posterior glabrous areas of IV, V and VI elongate; suture between Cx VI and VII curved; lateral margins of Cx not double. Carinae delimiting margins of inner tergal disc continuous posteriorly to hind border of segment VI. Pygophore large, apically rounded, with width 1.6 times length and with a broad, median depression running full length; paratergites of VIII slender, with apices symmetrically rounded.

Thoracic and abdominal sterna finely punctate; spiracles of segment II-VII ventral; suture between St VI and VII straight in middle and angled posteriorly at sides. Legs with femora slender, those of forelegs with length 2.8 times width.

FEMALE. As for ♂ except: sublateral Cx carinae extending weakly on to segment VII; paratergites of VIII with apices sub-angulate, level with apex of segment IX; carinae bordering inner tergal disc obsolete beyond apical two thirds of segment VI; apices of wings reaching just beyond hind border of Tg V.

MEASUREMENTS. Holotype ♂ first, then range of 2♀ paratypes. L: 4.42, 5.67; W: 1.72, 2.44-2.52; HL: 0.76, 0.90-0.92; HW: 0.76, 0.86; PL: 0.58, 0.72-0.76; PW: 1.34, 1.72-1.76; AS: I, 0.30, 0.32-0.34; II, 0.24, 0.30-0.32; III, 0.34, 0.40-0.42; IV, 0.30, 0.32-0.38; SL: 0.68, 0.86-0.90; SW: 0.90, 1.16-1.20; WL: 2.28, 2.96-3.08.

DISTRIBUTION (Fig. 14). This rare species has been taken in open forest at several localities from Emerald in central Queensland to Coonabarabran in New South Wales. The ♀ from Brisbane requires confirmation as the species has not yet been verified there by the writer despite years of collecting in the vicinity.

REMARKS. This is the smallest *Neuroctenus* in Australia and one of the smallest in the world. Male genitalia have not been studied because of the rarity of male specimens.

Neuroctenus grandis Kormilev, 1965
(Figs 5C, 7E, 12H,N,P, 13H,W)

Neuroctenus grandis Kormilev, 1965a: 28 (descr., fig.); Kormilev, 1971:64,71 (incl. in key; locality records); Kormilev & Froeschner, 1987:168 (listed).

TYPE. Holotype ♀, Blackbutt, S.E. Qld., 4.v.1964, G.B. Monteith, QMT6323. Examined.

MATERIAL EXAMINED. Type and 169 specimens: NORTH QUEENSLAND: Forty Mile Scrub, 40 ml. SW of Mt Garnet, in QM. SOUTH QUEENSLAND: Eidsvold, in ANIC, QM, AM; Dan Dan Scrub, via Calliope; Eurimbula Creek, via Round Hill Head; 9km N. of Taroom; 30km E. of Taroom, in QM; Coongara, via Biggenden, in ANIC; Tungi Creek, Jimna SF; Bunya Mountains, 1♀ paratype (QMT26094), Upper Canungra Creek, via Canungra, in QM; Sawpit Ck, 23 km E.Woodenbong, in ANIC; Levers Plateau, via Rathdowney; Bald Mountain area, 3-4,000', via Emu Vale, in QM; Macpherson Range, in QDPI; National Park, Macpherson Ra., in AM. NEW SOUTH WALES: 63km W Wauchope, in QM; Ulong, E.Dorrigo, in AM; 5 km. SE of Dorrigo, in ANIC; Carrai Plateau, via Kempsey; Barrington House, via Salisbury; Woko NP, N Gloucester, in QM; Ourimbah, in BMNH; Mt Kiera; Jamberoo Mtn, in BCRI; London Formation, Kiola, in wood of *Acacia mearnsii*, in ANIC. VICTORIA: Mt Drummer, via Cann River; Dandenong Ranges, in QM. (QM duplicates lodged in DJ, EH, SAM, UQIC, UZMH, NMB).

DESCRIPTION. Large, broad, 7-8mm long, with carinae of rostral groove coalescing posteriorly. Dark reddish brown.

MALE. Head slightly longer than wide; vertex with dense, upright granules; lateral of vertex ovate glabrous areas are separated from eyes by prominent supraocular ridges; postocular tubercles blunt, barely reaching outer profile of eyes; antenniferous tubercles apically acute, curved laterally; genae long, almost reaching apex of first antennal segment. Rostrum reaching beyond level of hind border of eyes; rostral groove with lateral carinae which meet behind rostral apex. Antennae 1.7-1.8 times head length, segment III longest.

Pronotum with width 2.2-2.4 times median length, surface sparsely granular; lateral margins biconvex with wide explanate rims on anterior half; collar well-marked, separated off by a deep sulcus; transverse depression between fore and hind lobes distinct; submedian areas with prominent glabrous discs; sublateral areas obliquely inflated. Scutellum with width 1.24-1.3 times length; surface coarsely granular with median ridge irregularly marked on posterior half. Hemleytra extending to hind margin of segment VI; corium reaching just beyond hind margin of Cx II; membranes black, opaque.

Abdominal connexiva densely punctate; sublateral carinae obsolete; glabrous areas sub-circular; mesal sutures of Cx IV and V sinuate; suture between Cx VI and VII weakly curved; carinae delimiting inner tergal disc low and continuous posteriorly to hind margin of segment VI. Pygophore with width 1.7 times length, with a deep, triangular, dorsal depression extending for almost full length; paratergites of VIII narrow, symmetrically rounded apically, and with spiracles ventral.

Thoracic sterna finely wrinkled; abdominal sterna finely punctate; spiracles of segment II-VII ventral; anterior margin of St VII evenly rounded. Legs with femora not strongly incrassate, those of forelegs with length 2.5 times width.

Parameres as in Fig. 12P.

FEMALE. As for male except: sublateral carinae prominent of Cx III-VI, obsolete on VII; carinae delimiting inner tergal disc prominent but becoming obsolete just anterior to hind margin of VII; wings reaching to apical 2/3 of Tg VI; paratergites of VIII broad, apically rounded, exceeding length of segment IX; segment IX without projections. Spermatheca (Fig. 12N).

MEASUREMENTS. Holotype ♀ first, then ranges of additional 2♂ and 2♀. L: 8.00, 7.17-7.50, 7.83-8.00; W: 4.00, 3.16-3.67, 3.92-4.75; HL: 1.24, 1.12-1.22, 1.18-1.20; HW: 1.22, 1.16-

1.20, 1.14-1.18; PL: 1.22, 1.10, 1.14-1.18; PW: 2.72, 2.42-2.60, 2.56-2.75; AS: I, 0.54, 0.50-0.52, 0.50-0.56; II, 0.60, 0.52-0.54, 0.52-0.54; III, 0.68, 0.56-0.60, 0.56-0.60; IV, 0.48, 0.44-0.46, 0.40-0.46; SL: 1.44, 1.30; 1.34-1.44; SW: 1.90, 1.60-1.68, 1.74-1.80; WL: 4.58, 4.17-4.58, 4.50-4.67.

DISTRIBUTION (Fig. 14). This species occurs in wet sclerophyll and poorer rainforests of mountains and lowlands over an extensive area of the eastern Australian seaboard from north Queensland to Victoria.

REMARKS. *Neuroctenus grandis* is the largest species in eastern Australia. It is similar in general facies to *N. proximus* from SW Australia but the 2 species differ in rostral atrium, parameres, genal length, male sternum VII, etc. and are not closely related. On present collecting records there is a gap in the range of *N. grandis* of 1000km between Round Hill Head and Mt Garnet.

Neuroctenus proximus (Walker, 1873)
(Figs 12G,J,L,O, 13D,J,U, 16O)

Mezira proxima Walker, 1873: 28 (descr.)

Neuroctenus majusculus Bergroth, 1887: 181 (descr.); Lethierry & Severin, 1896: 45 (listed); Usinger & Matsuda, 1959: 273 (listed); Kormilev, 1965a: 28 (locality records); Kormilev, 1965b: 5 (locality records); Kormilev, 1967a: 532 (locality records); Kormilev, 1971: 63,71 (incl. in key; locality records); Kormilev & Froeschner, 1987: 171 (listed) *syn. nov.*

Neuroctenus proximus Bergroth, 1887: 187 (cites Walker's descr.); Lethierry & Severin, 1896:45 (listed); Distant, 1902: 362 (generic assignment); Kormilev, 1953: 344 (locality record; probably misident. of *handschini*); Usinger & Matsuda, 1959: 273 (listed); Kormilev, 1965a: 28 (locality records; misident. of *Neuroctenus woodwardi*, sp. nov.); Kormilev, 1965b: 5 (locality records; probably misident. for *N. woodwardi* and *N. handschini*); Kormilev, 1967a: 532 (locality records; misident. of *N. woodwardi*); Kumar, 1967 (internal anatomy; misident. of *N. woodwardi*); Kormilev, 1971: 64 (incl. in key; misident. of *N. woodwardi*); Kormilev & Froeschner, 1987: 173 (listed).

TYPES. Lectotype Selection for *Mezira proxima* Walker.

Walker (1873) based his description of *proxima* on a series of 8 specimens ('a-h') with the data 'King George's Sound, Australia. Presented by Sir G. Grey'. I have examined 7 specimens (3♂ 4♀) of this series in the British Museum. Six bear white printed labels with the words '*Mezira proxima* Walker's Catal.'; one bears a printed label, '25. *Mezira proxima*', which is a piece cut from the title of Walker's description of the species from a copy of his original publication; the last specimen bears a printed label, '*Mezira leucotelus* Walker's Catal'. This last label is obviously in error because *leucotelus* was described immediately after *proxima* in Walker's catalogue and belongs to a quite different species now placed in *Aradus*. Each specimen also bears a circular, white label with a handwritten number referring to the Accession Register of the British Museum. The numbers are prefixed with '40/12.26' and end with specimen numbers: 271, 272, 273, 274, 275, 277, 278. Obviously the missing specimen bears the number 276. These Register entries refer to a batch of insects from 'New Holland, King George's Sound. Presented by Capt. Grey' and of this batch nine '*Aradus*' were numbered 271-279. These data, apart from Capt. Grey's transition to knighthood, are identical to those of the series cited by Walker. The specimens are conspecific and mounted identically on short, headless pins.

I have selected the male numbered 271 as *lectotype*. It is in good condition and has all appendages intact; the wings are slightly displaced by growth of verdigris around the pin. The specimen now bears the following labels: (1) Circular, white, handwritten, '40 12.16 271'; (2) Rectangular, white, printed, '*Mezira proxima* Walker's Catal.'; (3) Rectangular, red, handwritten, 'LECTOTYPE *Mezira proxima* Walker, 1873'; (4) Rectangular, white, printed, '*Neuroctenus proximus* (Walker, 1873) Det. G.B. Monteith, 1978'. The remaining six specimens have been labelled paralectotypes.

Synonymy of majusculus *Bergroth*. Bergroth (1887) described *majusculus* in his revision of *Neuroctenus*. At that time he was not familiar with Walker's *Mezira proxima* in life although he noted that W.L. Distant had drawn his attention to the fact that it belonged in *Neuroctenus*. Bergroth merely listed *proximus* at the end of his paper with Walker's description reproduced verbatim. Bergroth apparently did not realize that Walker's species also came from Western Australia since he refered to his *majusculus* as 'the only west-australian species'. The only original Bergroth specimen I have been able to trace and examine is a male in the Humboldt University, Berlin. It bears a label '*Neuroctenus majusculus* Bergr' in the same handwriting as that on Bergroth's type of *Brachyrhynchus scrupulosus* in the same collection. Its locality label reads

'Swan River, Thorey' and it is conspecific with Walker's *Mezira proxima*.

MATERIAL EXAMINED. Types and 274 specimens: WESTERN AUSTRALIA: Albany, in BMNH; Mundaring, Greystones, ex *Eucalyptus calophylla* logs; Mundaring, ex *Eucalyptus calophylla*; Manjimup, ex Karri; Donnybrook, in WADA; 7 ml. S of Pemberton, in ANIC and QM: Manjimup, on newly fallen trees, in ANIC and QM; Nornalup, in ANIC, in UQIC; 50km SW Nannup; Beedelup NP; Molgnup Springs, Stirling Ranges; Boranup Drive, 4km NW Karridale; Yallingup; Pemberton, in ANIC; Boranup, in WAM & QM; Walpole Dist. in QM; Glenoram, 10ml. W. Manjimup; South of W. Aust., in SAM; Walpole, 'The Knoll'; Boranup; Dingup; Manjimup; 5ml N Augusta; in WAM; Wilga, in AM.

DESCRIPTION. Large, broad, 7.6-9.00mm long, with carinae of rostral groove not coalescing posteriorly, posterolateral angles of male Cx VI protruding and legs very slender. Dark reddish brown.

MALE. Head slightly longer than wide; vertex with dense granules; laterad of vertex large glabrous areas are separated from eyes by raised supraocular ridges; postocular tubercles very narrow, apically acute, extending beyond outer profile of eyes; antenniferous tubercles pointed, with apices slightly divergent; genal processes apically rounded and separate, distinctly longer than apex of first antennal segment. Rostrum extending posteriorly beyond hind border of eyes; rostral groove with lateral carinae which are separate for full length. Antennae 1.5-1.6 times head length, segment III longest.

Pronotum with width 2.2-2.3 times median length; surface sparsely granular; lateral margins slightly indented at anterior third, with an explanate margin on anterior half; collar distinct and separated by a groove; transverse depression evident at sides but not medially; submedian areas with large glabrous discs; sublateral areas faintly inflated. Scutellum with width 1.39-1.9 times length; surface longitudinally wrinkled on anterior half and transversely wrinkled on posterior half. Hemelytra reaching hind border of segment VI; coria reaching to almost half length of Cx III; membranes black, opaque.

Connexival surface finely punctate, without trace of sublateral carinae; glabrous areas of Cx III-VI circular, mesal sutures of Cx IV and V sinuate; suture between Cx VI and VII curved; external Cx margins not double; posterolateral angles of Cx VI protruding; margins of segment VII sinuate and with a narrow, flattened margin differentiated by striations from remainder of punctate surface of VII; carinae delimiting inner tergal disc faint, becoming obsolete posterior to segment V. Pygophore with width 1.6-1.7 times length, uniformly rounded behind; dorsum with an impressed U-shaped area on anterior half; paratergites of VIII narrow, with apices symmetrically rounded and spiracles ventral.

Thoracic sterna faintly wrinkled; abdominal sterna finely punctate; suture between St VI and VII straight in middle and angled posteriorly at sides. Legs with femora very slender, those of forelegs with length 3.1-3.2 times width; hind femora with inner margin curved giving a curved appearance and apex reaching almost to hind margin of St IV.

Parameres as in Fig. 12O.

FEMALE. As for ♂ except: sublateral carinae well developed on Cx III-VII; surface of Cx coarsely punctate; wing apices reaching to 1/2 length of segment VI; paratergites of VIII large, broad, apically rounded, reaching beyond apex of segment IX; segment IX with a pair of widely spaced projections, giving its apex a trilobed appearance; ventral, sublateral, connexival carinae very prominent on segments III-VII. Spermatheca as in Fig. 12L.

MEASUREMENTS. Lectotype ♂ of *proximus* first, syntype ♂ of *majusculus* second, then ranges of additional 2♂ and 2♀. L: 8.17, 8.17, 7.67-8.00, 8.67-8.83; W: 3.75, 3.83, 3.75-3.58, 4.08-4.17; HL: 1.40, 1.32, 1.32-1.34, 1.40-1.44; HW: 1.34, 1.28, 1.26-1.32, 1.28-1.38; PL: 1.22, 1.24, 1.20, 1.30-1.40; PW: 2.84, 2.80, 2.68-2.72, 2.90-3.08; SL: 1.42, 1.40, 1.36, 1.46-1.52; SW: 1.92, 1.84, 1.82-1.90, 2.02-2.04; WL: 4.67, 4.75, 4.50-4.58, 4.92-5.33; corium length: 1.80, 1.72, 1.68-1.80, 1.72-2.00; pygophore length: 0.68, 0.68, 0.68-0.70; pygophore width: 1.10, 1.14, 1.10-1.16; AS: I, 0.46, 0.46, 0.48, 0.50-0.54, II, 0.50, 0.52, 0.50-0.52, 0.54-0.58, III, 0.64, 0.60, 0.60, 0.62-0.64, IV, 0.54 0.52, 0.50-0.52, 0.52-0.54.

DISTRIBUTION (Fig. 14). This is a common eucalypt forest species in the SW of Western Australia from Perth to Albany. It overlaps broadly with the distribution of its very close relative *N. transitus*.

REMARKS. Bergroth (1887) suggested close relationship between this and Madagascan species but this cannot be evaluated at present.

Neuroctenus transitus sp.nov.
(Fig. 16P)

TYPE. Holotype ♂, Floreat Park, W. Australia, 21.ii.1966, R.Humphries, WAM78/637.

MATERIAL EXAMINED. Holotype and 87 paratypes: SW AUSTRALIA: Deep Dene, Karridale, 1 ♀, 19.xii.1962, L.M. O'Halloran, in WAM;Kings Park, Perth, 1 ♂ 5 ♀, 24.xiii.1959, Armstrong & Woodward, in QM; Floreat Park, 11 ♂ 15 ♀, 21.ii.1966, R.Humphries, 4 ♂ 16 ♀, 4.ii.1967, R.Humphries; Wanneroo, 3 ♂ 2 ♀, 2.iv.1971, S.M.Wade; West Midland, 4 ♂ 3 ♀, 28.ii.1954, A.M.Douglas; Midland, 1 ♀, viii.1936, L.Glauert; Rottnest Island, 1 ♀, xii.1934, L.Glauert, in WAM; Walpole, 2 ♀, 26.x.1984, J.& N.Lawrence; Prevelly Park, W Margaret R., 1 ♂ 7 ♀, 31.x.1984, J.& N.Lawrence; Crawley, 1 ♂ 2 ♀, 16.ii.1934, K.R. Norris, 1 ♂, 19.ii.1935, K.R. Norris, 1 ♀, 30.xii.1935, K.R. Norris; Pipehead Dam, 15 ml SSE of Armadale, 1 ♀, 26.i.1967, M.S. Upton, in ANIC; Brentwood, 1 ♀, 11.ii.1969, K. Richards; Busselton, 1 ♀, 2.iii.1971, Forests Dept.; Donnybrook, 3 ♂ 1 ♀, April, L.J. Newman, in WADA. (Paratypes: QMT29688-29700).

DESCRIPTION. Large, broad, 6.7-8.4mm long, with carinae of rostral groove not coalescing posteriorly, posterolateral angles of male Cx VI protruding and legs short and stout. Dark, reddish brown.

This species is very similar to *N. proximus* and is described only where different from that species: legs shorter, stouter and with surface of femora granulate; fore femora with length <3 times maximum width; hind femora straight, with inner margin not sinuate and with distal apex reaching to about half length of St IV. Pygophore of ♂ without horseshoe-shaped impression. ♀ with apex of segment IX not trilobed.

MEASUREMENTS. Holotype ♂ first, then range of 2♂ and 2♀ paratypes. L: 7.36, 6.88-8.00, 6.72-8.37; W: 3.20, 3.1-3.60, 3.00-4.00; HL: 1.10, 1.10-1.15, 1.10-1.25; HW: 1.10, 1.10-1.15, 1.00-1.20; PL: 1.00, 1.00-1.10, 1.00-1.15; PW: 2.30, 2.25-2.50, 2.20-2.60; AS: I, 0.38, 0.35-0.38, 0.33-0.40; II, 0.42, 0.40-0.48, 0.38-0.48; III, 0.46, 0.42-0.48, 0.44-0.42; IV, 0.38, 0.33-0.38, 0.36-0.40; SL: 1.25, 1.15-1.35, 1.15-1.50; SW: 1.60, 1.70-1.85, 1.50-1.85; WL: 4.00, 4.00-4.50, 3.75-4.75; corium length: 1.35, 1.35-1.50, 1.35-1.60..

DISTRIBUTION (Fig. 14). *Neuroctenus transitus* is an open forest, subcortical species which occurs from suburban Perth south throughout the moist SW corner of Western Australia.

REMARKS. This species is almost completely sympatric with its very close relative *Neuroctenus proximus*. Both species occur in large colonies under bark but are never taken in mixed colonies. No apparent ecological difference between these co-existing species is evident. Although practically identical in dorsal view they are readily separated by their very different legs.

Neuroctenus occidentalis sp. nov.
(Figs 5B, 12B,R, 13L)

TYPE. Holotype ♂, 33.51 S 123.00 E, Thomas River, 23 km NW by W of Mt Arid, W.A., 4-7.xi.1977, J.F. Lawrence, under bark. In ANIC.

MATERIAL EXAMINED. Type plus 6 nymphs collected with it, in ANIC.

DESCRIPTION. Medium-sized, 7.00mm long, with rostral carinae not coalescing posteriorly and with genal processes surpassing apex of first antennal segment.

MALE. Head with length 1.16 times width; vertex densely granular; supraocular carinae weak; postocular processes rather blunt, reaching a little beyond outer profile of eyes; antenniferous tubercles slightly divergent, apically sub-acute, reaching a little beyond one third length of first antennal segment. Genal processes long, parallel-sided, apically cleft, reaching well beyond apex of first antennal segment. Rostrum reaching slightly beyond hind margin of eyes; lateral carinae of rostral groove present and not contiguous behind rostral apex. Antennae stout, length 1.3 times head length; segments I, II and IV subequal in length, segment III slightly longer.

Pronotum with width 2.2 times median length, its surface granular; lateral margins straight; collar distinct. Scutellum with width 1.22 times length; surface rugose-granulate; median ridge weakly developed on posterior half. Hemelytra reaching behind hind margin of segment VI; apex of corium reaching a little beyond hind margin of Cx II; membranes black, opaque, shining.

Dorsal Cx surfaces punctate; sublateral carinae very weakly developed on Cx III-V, becoming obsolete on VI and absent on VII; posterior glabrous ares of Cx III-VI subcircular; mesal sutures of Cx IV and V sinuate; suture between Cx VI and VII curved; lateral Cx margins not double. Carinae delimiting inner tergal disc present, becoming obsolete on segment VI. Pygophore with width 1.5 times length; its surface granular and with a median, longitudinal impression on posterior half; hind margin evenly rounded; paratergites of segment VIII short, slightly curved mesally and with spiracles ventral.

Thoracic sterna finely wrinkled; abdominal sterna finely punctate; suture between St VI and VII evenly rounded; spiracles of II-VII ventral. Legs with femora moderately stout, those of fore legs with length 2.3 times width.

Parameres as in Fig. 12R.

FEMALE. Unknown.

MEASUREMENTS. Holotype ♂. L: 7.00; W: 3.08; HL: 1.16; HW: 1.00; PL: 1.00; PW: 2.22; AS: I, 0.36, II, 0.38, III, 0.40, IV, 0.36; SL: 1.20; SW: 1.46; WL: 4.25; corium length: 1.50; pygophore length: 0.56; pygophore width: 0.86.

DISTRIBUTION (Fig. 14). Known from a single series collected under bark in semi-arid country NE of Esperance in SW Western Australia.

REMARKS. Although only a single adult is available it is sufficiently distinct to justify description. It resembles the other two species in SW Australia, *N. proximus* and *N. transitus*, in some respects but differs markedly in paramere shape and in lacking the characteristic protruding posterolateral angle of Cx VI seen in the other species. *N. occidentalis* seems ecologically separated from the others in SW Australia in occurring far outside the 800mm rainfall isohyet which approximately defines the distribution of the latter species in the wettest part of the southwest.

Neuroctenus woodwardi sp. nov.
(Figs 2D, 5A, 11, 12Q, 13K,T)

Crimia rubrescens Walker, 1873: 14 (misident. of Australian specimens).
Neuroctenus proximus: Kormilev, 1965a: 28 (misident.); Kormilev, 1965b: 5 (misident.); Kormilev, 1967a: 532 (misident.); Kumar, 1967 (misident.); Kormilev, 1971 (misident).

TYPE. Holotype ♂, Forest Station, 600m, Bulburin State Forest, via Many Peaks, Qld. 12-15.iv.1974, I. Naumann, QMT11653.

MATERIAL EXAMINED. Holotype and 566 paratypes: NORTH QUEENSLAND: Hann Tbld Radar Stn, 800-900m, 1♂, 8.ii.1996, GBM; Mt Fox Crater, Seaview Range, 25♂ 19♀, 15.xii.1986, GBM, GIT & S.Hamlet; CENTRAL QUEENSLAND: Shute Harbour, 5♂ 7♀, 24.v.1968, GBM, Springcliffe, via Mackay, 1♂ 3♀, 12.i.1965, J.E. Dunwoody; Cape Hillsborough, 3♂ 3♀, 15-16.iv.1979, GBM, in QM; Mackay, 1♂, in BCRI. SOUTH QUEENSLAND: Kroombit Tops, Beauty Spot 98, 45km SSW Calliope, 9♂ 4♀, 29.ix.1985, GBM, in QM ; Kroombit Tops, Upper Kroombit Ck, 2♂ 3♀, 9-19.xii.1983, GBM,GIT; Kroombit Tops, Upper TA47 Ck, 1♀, 9-19.xii.1983, GBM,GIT; Kroombit Tops, TA47 Ck Xing, 17♂ 19♀, 30.ix.1985, GBM; Bundaberg, 1♀, 5.v.1928, R.W. Mungomery, in QM, 7♂ 5♀, in BMNH; Forest Station, 2000', Bulburin SF, 4♂ 11♀, 12-15.iv.1974, GBM, 4♂ 5♀, 12-15.iv.1974, I. Naumann, in QM; Rosedale, 1♂, 27.x.1974, H.Frauca; Hervey Bay, 2♂ 2♀, xii.1972, P.Turner; Bluff Range, Western Sect., via Biggenden, 2♂ 3♀, 18.viii.1972, H.Frauca; Mt Walsh NP, 1♂ 1♀, viii.1972, H.Frauca; Boat Mtn, via Murgon, 580m, 3♂ 1♀, 14.x.1994, GBM; Maroochydore, 1♂ 1♀, 21.xii.1972, S.Allen, in ANIC; Toorbul Point, 1♀, 4.vii.1971, G.Grant; Caboolture, 17.1971, L.Hill, in UQIC; Caloundra, 1♀, 14.viii.1960, R.D. Cameron, in QM, 1♀, in QDPI; Highvale, 7♂ 10♀, 20.ix.1964, GBM, in ANIC; Miles, 5♂ 2♀, 10.i.1939, N.Geary, in AM; Moss's Well, Spicer's Gap, 17♂ 17♀, 13-14.x.1984, R.de Keyzer, in UQIC; Bunya Mountains, 2♂ 1♀, 2-4.v.1964, GBM; Mt Glorious, 6♂ 6♀, *Acacia* bark, 10.i.1982, A.Hiller, 1♀, 10.xi.1978, A.Hiller, 7♂ 5♀, A.Hiller; Mt Nebo, 1♀, 15.xi.1979; Cedar Creek, Samford, 1♀, 20.v.1964, R. Woolcock, in QM, 1♀, 10.x.1970, T.Lennon; Moggill, 1♀, 18.x.1981, T.Johnson, 3♂, 21.x.1984, R.de Keyzer, in UQIC; Flinders Peak, 2♀, 14.iii.1982, D.Sinclair & A.Rozefelds; Cabbage Tree Point, 6♂ 1♀, 17.iv.1979, A.Rozefelds; Brisbane, 1♂ 2♀, vii.1986, R.Raven, 1♂, 19.viii.1959, Kirkpatrick, 1♀, 12.x.1957, Fortunado, 1♂, 20.ix.1959, J. Martin, 1♂, 7.ix.1964, BKC, 1♀, 1.ix.1975, RIS, 1♂ 1♀, 20.ii.1963, B. Ross, 1♂ 1♀, 16.vii 1956, G. Grant, 2♂ 1♀, 14.xii.1979, F.R.Wylie, in QM, 1♀, 2.iv.1969, P.Twine, in UQIC, 1♀, 14.xii.1907, in ANIC, 1♂, 6.xi.1973, 2♂ 3♀, 5.ii.1919, H. Jarvis, in QDPI, 1♂ 1♀, 30.vii.1914, H.Hacker, in BMNH; Gold Creek, via Brookfield, 1♂ 2♀, 28.iv.1964, GBM; Mt Crosby, 1♀, 3.vii.1972, I. Naumann; Mt Glorious, 1♂ 1♀, 15.i.1963, GBM; Acacia Ridge, 9.vi.1963, R. Kumar, 1♂, 10.ii.1962, E.C. Dahms; Dunwich, 1♂ 1♀, 27.iv.1963, GBM, 1♂ 2♀, 9.v.1964, GBM, in QM; Stradbroke Island, 1♀, 9.iii.1974, P.Samson, 1♀, 9.iii.1974, D.Smith; Brookfield, 1♂, 15.iv.1982, R.Burrell, in UQIC; Mt Nerang, 2♂ 1♀, 22.viii.1972, I. Naumann; Bald Mountain area, 3-4000', via Emu Vale, 1♀, 17-22.v.1969, GBM, 1♂, 27-31.i.1972, GBM, 3♂ 1♀, 26-30.i.1975, I. Naumann, in QM; Blunder, 3♂ 5♀, 16.viii.1959, in ANIC; Hampton, 4♂, 24.ii.1967, J.H. Barrett; Tamborine, 1♂, 3.v.1919, H. Tryon, in QDPI, 1♂ 1♀, Mjöberg, in NRS. NEW SOUTH WALES: Walgett, 3♂ 1♀, 13.vi.1970, P.J.Walters, in QM Middle Brother SF, nr Kendall, 1♂, 16.xi.1983, D.C.F.Rentz & M.S.Harvey, 4♂ 3♀, 11.viii.1990, T. Gush; Prospect, 22♂ 22♀, 5.viii.1990, T. Gush; Kioloa, in Acacia wood, 1♀, 19.xii.1980, J.Conran; Myall Lakes, 1♂ 2♀, viii.1934, D.F. Waterhouse, 1♀, viii.1934, M.F. Day, in ANIC; Barrington House, via Salisbury, 1♂, 17-20.xii.1963, A. Macqueen, in QM: Hornsby, 2♂, C.Gibbons, in AM; Sydney, 7♂ 6♀, 1900-1903, J.J.Walker; Wedderburn, 3♂ 3♀, 18.x.1960, M.I.Nikitin, in BMNH, 9♂ 9♀,

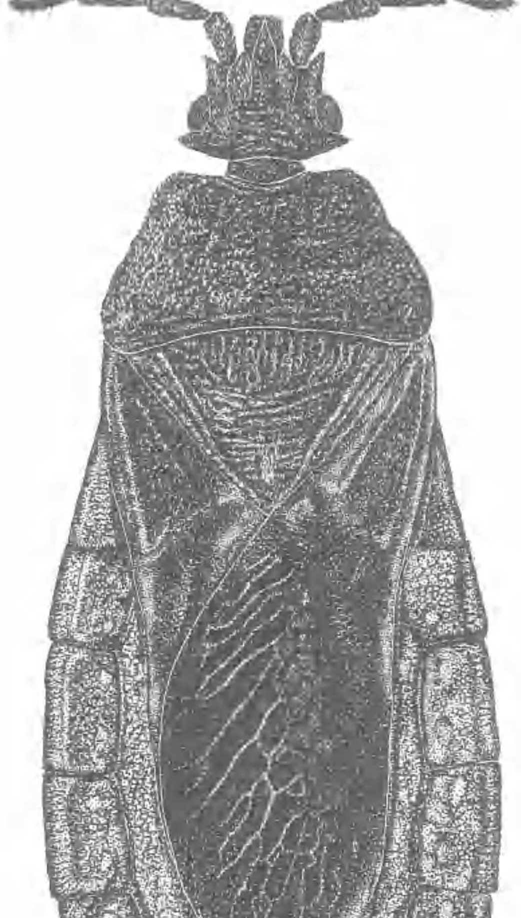

FIG. 11. Dorsal view of ♂ *Neuroctenus woodwardi*.

18.v.1959, C.E.Chadwick; Cowan, 12♂ 15♀, 5.iii.1961, C.E.Chadwick; Wogamia, nr Nowra, 1♀, 20.ix.1970, C.E.Chadwick; Mt Kembla, 3♂ 3♀, 15.viii.1970, C.E.Chadwick, 1♀, 12.vi.1965, C.E.Chadwick; Grose Wold, W of Richmond, 1♂ 1, 18.ii.1967, C.E.Chadwick; Katoomba, 1♂, 15.iv.1968, B.White, in BCRI; Cabramatta, 1♂ 4♀, 2.vii.1960, M.I.Nikitin, in BMNH; Blackheath, 1♀, 29.ii.1936, D.F. Waterhouse; Tuross Head, 11 ml S of Moruya, 3♂, 21.ix.1969, S. Misko, in ANIC, 1♂ 1♀, 21.ix.1969, S. Misko, in QM; Marley, 1♂ 3♀, 23.xi.1949, R.Ellery, in AM; Unanderra, 2♂ 4♀, 3.x.1955, C.E.Chadwick, in BMNH & BCRI. AUSTRALIAN CAPITAL TERRITORY: Cotter River, 1♂ 4♀, 11.i.1964, D.F. Waterhouse, in ANIC, 1♂ 1♀, 11.i.1964, D.F. Waterhouse, in QM. TASMANIA: West Tamar, 1♀, in SAM; Launceston, 3♂ 3♀, 2.ii.1928, V.V.Hickman, in AM; Hobart, 1♂ 1♀, 8.vii.1987, G.Bornemissza, 7♂ 5♀, 2.vii.1987, G.Bornemissza, 4♂ 2♀, 18.vi.1987, G.Bornemissza, in QM, 1♂, J.J.Walker, in BMNH, 1♀, 3-12.xii.1986, Burckhardt, in MNHG. NO STATE SPECIFIED: Australia, 1♀, 58.124, 6♂ 4♀, 1958-59, M.I.Nikitin, in BMNH. (QM duplicates lodged in DJ, EH, NMNH, HNHM, UZMH, NMB) (QM Paratypes: QMT14886-14929, QMT25524, QMT26095-26299, QMT29705-29708).

DESCRIPTION. Medium-sized, 6-7.4mm long, with rostral carinae meeting posteriorly and with symmetrically rounded paratergites of VIII in male. Dark reddish brown.

MALE. Head with length 1.1 times width; vertex transversely rugose; supraocular carinae weak; postocular processes narrow, rather blunt, reaching outer profile of eyes; antenniferous tubercles short, reaching basal third of first antennal segment. Rostrum reaching level of hind margin of eyes; lateral carinae of rostral groove approximated behind rostral apex. Antennal length 1.35-1.55 times head length; segment II, III and IV subequal.

Pronotum with width 2.2-2.4 times median length, its surface granular; lateral margins faintly sinuate and edged with a narrow carina on anterior half; pronotal surface largely flat with transverse impression separating fore and hind lobes marked at sides only; collar forming a narrow ridge indistinctly separated from pronotal disc. Scutellum with width 1.2-1.25 times length; surface longitudinally rugose on anterior half and transversely rugose on posterior half; median ridge weakly marked on posterior half. Hemelytra reaching hind margin of Tg VI; apex of corium reaching hind margin of Tg II; membranes black, opaque, shining.

Dorsal connexival surfaces punctate; sublateral carinae present on Cx III-V, becoming obsolete on VI, absent on VII; posterior glabrous areas of Cx III-VI strongly elongate; mesal sutures of Cx IV and V sinuate; suture between Cx VI and VII weakly curved; lateral Cx margins not double; carinae delimiting inner tergal disc present, becoming obsolete posterior to segment VI. Pygophore with width 1.7 times length; its surface granular and with a broad, triangular impression on midline of basal three quarters; hind margin evenly rounded; paratergites of segment VIII short, symmetrically rounded apically; spiracles ventral.

Thoracic sterna finely wrinkled; abdominal sterna finely punctate; hind margin of St VI straight in middle and angled posteriorly at sides; St with a short, longitudinal sulcus on each side of midline behind anterior edge; spiracles of segment II-VII ventral. Legs with femora rather stout, those of forelegs with length 2.1 times width.

Parameres as in Fig. 12Q.

FEMALE. As for ♂ except: abdominal dorsum more coarsely punctate; wings reaching to basal third of Tg VI; carinae delimiting inner tergal disc obsolete on Tg VII; paratergites of VIII short, rounded, reaching apex of segment IX, with spiracles sub-lateral; segment IX without projections.

MEASUREMENTS. Holotype ♂ first, then ranges of additional 2♂ and 2♀ paratypes. L: 6.33, 6.00-6.50, 6.17-7.33; W: 2.80, 2.52-2.83, 2.58-3.25; HL: 1.02, 1.00-1.10, 1.00-1.12; HW: 0.94, 0.94-1.00, 0.92-1.08; PL: 0.80, 0.78-0.90, 0.80-0.90; PW: 1.90, 1.86-2.06, 1.82-2.20; AS: I, 0.34, 0.32-0.36, 0.34-0.36; II, 0.40, 0.36-0.38, 0.38-0.46; III, 0.42, 0.40, 0.38-0.48; IV, 0.40, 0.36-0.38, 0.38-0.44; SL: 1.06, 1.00-1.14, 1.00-1.20; SW: 1.28, 1.26-1.36, 1.21-1.50; WL: 3.75, 3.67-4.00, 3.50-4.42.

DISTRIBUTION (Fig. 14). This species is known from open eucalypt forests of a narrow coastal belt of eastern Australia from the Hann Tableland in north Queensland to southern New South Wales. It also occurs in Tasmania but has not yet been taken in Victoria. Kormilev (1965a: 105) recorded a single ♀ from Atherton, in the wet tropical part of north Queensland. I have examined this specimen and it is *woodwardi* but I believe it is a mislabelled member of the series from Tamborine also mentioned by Kormilev. In the northern part of its range it is occasionally taken in dry rainforest.

REMARKS. It is a great pleasure to give the name of the late Dr T.E. Woodward, hemipterist, formerly of the University of Queensland, to this species which is so common in eastern Australia.

This species has been erroneously known in the literature and in most collections as *N. proximus* (Walker), a name which is correctly applied to an unrelated species from SW Australia. Also, when Walker (1873) described *Crimia rubrescens*, now placed in *Overlaetiella* (Kormilev, 1977), he listed 5 specimens from Australia as belonging to this species as follows: '*1 Australia, presented by the Haslar Hospital; 4 Australia, from Mr Damel's Collection*'. I have examined the Walker material of '*Crimia rubrescens*' in the British Museum and it now includes only one Australian specimen. This specimen is not conspecific with the rest of the series of *Overlaetiella rubrescens* but belongs to *N. woodwardi*. It is 58.124 which refers to a Register entry as follows: '*Australia. Sydney & Moreton Bay. Collected by Edward Damel & brought of Samuel Stevens. Localities are Maitland, Moreton Bay, Wollangong, Parramatta, Sydney*'. All these localities lie within the known range of *N. woodwardi*. Walker's species, *O. rubrescens*, does not occur in Australia.

Neuroctenus woodwardi is superficially similar to *N. handschini* but can be readily separated by its blunter postocular processes, symmetrical paratergites of the male, and the shorter paratergites of the female. Both species are abundant under bark of dead eucalypts and acacias. Although essentially allopatric their respective ranges overlap a little in north Queensland.

Neuroctenus handschini Kormilev, 1953
(Figs 12D,I,U, 13B,N,O)

Neuroctenus handschini Kormilev, 1953: 342 (descr., fig.); Usinger & Matsuda, 1959: 273 (listed); Kormilev, 1967a: 532 (locality records); Kormilev, 1971: 65 (incl. in key); Kormilev & Froeschner, 1987: 168 (listed).

Neuroctenus vicinus: Kormilev, 1953: 342 (misident.)

TYPE. Holotype ♂, Marrakai, N.T., May, 1934, Handschin, in NMB Examined.

MATERIAL EXAMINED. Holotype and 324 specimens: NORTHWEST AUSTRALIA: Montalivet Is., in BMNH. NORTHERN TERRITORY: Pularumpi, Melville Is, in NTM; Adelaide R; in BMNH; Marrakai, 1♀ allotype; Burnside, in NMB; Horn Islet, Pellew Group; West Alligator R. mouth; North Point, Kapalga; South Alligator Inn; Katherine Gorge, in QM; Fogg Dam, 53km SE Darwin; Darwin, ex nest of *Mastotermes*; 2ml ENE Victoria River Downs; Magela Creek, 12 km N of Mudginbarry, in ANIC; Darwin, Stapleton, in SAM & BMNH. NORTH QUEENSLAND: Moa Island, Torres Strait; Somerset, in SAM; Yorke Island, Torres Striat, in AM; Lockerbie; Mapoon; Weipa, in QM; 18km NE Mt Tozer; 13km ENE Mt Tozer, in ANIC; Rocky River, via Coen; Homestead, Silver Plains, via Coen; Musgrave, in QM; Mt Cook NP, via Cooktown, in ANIC; Station Ck., via Mt Carbine; Cooper Creek, 18 ml N of Daintree; Hartley's Creek; Ellis Beach, in QM; Bungalow, 2ml S Cairns, in ANIC; Cape Pallarenda, Townsville; Magnetic Island, in QM. CENTRAL QUEENSAND: Greta

Creek, 20ml N of Proserpine, in QM; Bluff (?), in SAM. (QM duplicates lodged in DJ, EH, NRS, UQIC)

DESCRIPTION. Small, 4.5-6.5mm long, with acute postocular tubercles and asymmetrical apices to male paratergites. Colour dark reddish brown.

MALE. Head slightly longer than wide; vertex rugose; supraocular carinae not prominent; postocular tubercles long, apically acute, extending beyond profile of eyes; antenniferous tubercles apically pointed, divergent, reaching basal third of first antennal segment; genal processes reaching apex of first antennal segment. Rostral apex level with hind margin of eyes; rostral groove with lateral carinae which coalesce behind rostral apex. Antennal length 1.4-1.5 times head length; all segments subequal.

Pronotum with width 2.45-2.7 times median length; surface granular and lightly rugose; lateral margins slightly sinuate at anterior third, with a narrow marginal rim becoming somewhat explanate at anterolateral angles; collar very narrow, indistinctly separated from pronotal disc; pronotal surface largely flat with transverse depression weakly marked at sides. Scutellum with width 1.25-1.35 times length; surface rugose, more or less transversely so on posterior half. Hemelytra reaching to just beyond half length of Tg VI; coria reaching posterior margin of Tg II; membranes opaque, with basal quarter pale and apical 3/4 dark.

Abdominal connexiva punctate; sublateral carinae on segments III-VI; posterior glabrous areas of Cx II-VI elongate; inner margins of Cx IV and V sinuate; suture between Cx VI and VII straight; lateral margins of Cx not double; carinae delimiting inner tergal disc prominent, becoming obsolete on segment VI. Pygophore with width 1.6 times length; its dorsum with a broad depression on basal half; its apex uniformly rounded; paratergites of VIII broad, with lateral margins straight and mesal side of apices produced; spiracles sublateral.

Thoracic sterna finely wrinkled; abdominal sterna finely punctate; suture between St VI and VII uniformly rounded; spiracles of II-VII ventral. Legs with femora rather slender, those of forelegs with length 2.35 times width.

Parameres as in Fig. 12U.

FEMALE. As for ♂ except: abdominal surface more coarsely punctate; sublateral connexival carinae present on II-VI and sub-obsolete on VII; hemelytra reaching just beyond posterior margin of Tg VI; paratergites of VIII sub-rectangular, with sides parallel and apices truncate; spiracles of VIII lateral; segment IX with two blunt ventral projections.

MEASUREMENTS. Holotype ♂ first, then ranges of additional 2♂ and 2♀. L: 5.67, 4.67-5.67, 6.00-6.50; W: 2.78, 2.12-2.75, 2.92-3.08; H: 0.94, 0.80-0.94, 0.94-0.98; HW: 0.88, 0.86-0.90, 0.90-0.96; PL: 0.64, 0.61-0.70, 0.66-0.84; PW: 1.76, 1.50-1.80, 1.80-2.04; AS: I, 0.34, 0.30-0.32, 0.32-0.36; II, 0.32, 0.26-0.30, 0.32-0.34; III, 0.34, 0.30-0.36, 0.42; IV, 0.36, 0.32-0.34, 0.36; SL: 0.96, 0.78-0.88, 0.96-1.02; SW: 1.20, 1.00-1.20, 1.28-1.36; WL: 3.25, 2.72-3.33, 3.50-3.67.

DISTRIBUTION (Fig. 14). *Neuroctenus handschini* is a common, open forest species occurring in a coastal strip of north Australia from the northwest of Western Australia east across the top half of the Northern Territory, the Gulf of Carpentaria, Cape York Peninsula, the Torres Strait islands and south on the Queensland coast to Prosperine. The only WA record is from the offshore Montalivet Island but it would be surprising if the species did not occur on the mainland in the adjacent, poorly-collected Kimberley region. The single old specimen in the South Australian Museum apparently labelled 'Bluff' may refer to the township of Bluff west of Rockhampton somewhat further south than Proserpine.

REMARKS. I examined the NT specimens in the Naturhistorisches Museum, Basle, identified by Kormilev (1953) as *N. vicinus* and find that they are typical *handschini*.

Neuroctenus handschini is similar to *N. woodwardi* in habits and appearance; it seems to be the ecological complement of *N. woodwardi* in north Australia. Like *N. woodwardi*, it sometimes occurs in monsoon rainforest patches. The parameres of the two species are very different. *N. kapalga* sp. nov., described below, is taxonomically much closer to *N. handschini* and occurs sypatrically with it in the NT.

Neuroctenus kapalga sp.nov.
(Fig. 12A)

TYPE. Holotype ♂, Channel Island, 12.33S 130.52E, 5 Jul 1982, M.B.Malipatil, under bark *Melaleuca*. In NTM.

MATERIAL EXAMINED. Holotype and 11 paratypes: NORTHERN TERRITORY: Channel Island, 12.33S X 130.52E, under *Melaleuca* bark, 3♂

5♀, 5.vii.1982, M.B.Malipatil, in NTM; Wildman River Station, 3♂ 5♀, 20.v.1980, L.Radunz, in NTM and QM; North Point, Kapalga, 1♀, 19.vii.1979, GBM & DJC, QMT29700-29703.

DESCRIPTION. Small, 5.4-6.9mm long, with rostral carinae converging posteriorly, with male VIII paratergites asymmetrical and with reduced postocular processes. Colour dark reddish brown.
MALE. Head slightly longer than wide; vertex rugose; supraocular carinae weak; postocular tubercles short, narrow, blunt, barely reaching outer profile of eyes; antenniferous tubercles pointed, divergent, reaching basal third of first antennal segment. Lateral carinae of rostral groove present, converging closely behind rostral apex. Antennal length 1.4-1.5 times head length; first 3 segments subequal, last slightly longer.

Pronotum with width 2.5-2.8 times median length, its surface granular; lateral margins almost straight, not explanate; collar a narrow rim only. Scutellum with width 1.3-1.45 times length; surface longitudinally rugose on anterior half and transversely rugose on posterior half. Hemelytra reaching hind margin of Tg VI; coria reaching hind margin of Tg II; membranes black, opaque, with basal quarter pale.

Abdominal connexiva punctate, their sublateral carinae obsolete; posterior glabrous areas of Cx III-VI weakly elongate; inner margins of Cx IV and V weakly curved; lateral connexival margins not double; carinae delimiting inner tergal disk distinct but low. Pygophore with width 1.62 times length, its surface granular, with a broad depression in middle of dorsum and with hind margin evenly rounded. Paratergites of segemt VIII broad, flattened, with inner margins asymetrically, spiracles sublateral.

Thoracic sterna finely wrinkled; abdominal sterna finely punctate; hind margin of St VI straight in middle and angled forward at sides. Spiracles of segments II-VII ventral. Legs with femora stout, those of forelegs with length 2.3 times maximum width.
FEMALE. As for ♂ except: abdominal dorsum more coarsely punctate; sublateral carinae on Cx III-VI present but faint; hemelytra reaching to two thirds length of Tg VI; paratergites of VIII reaching to level with apex of segment IX, their apices subtruncate, their spiracles sublateral; segment IX with two small blunt ventral projections.

MEASUREMENTS. Holotype ♂ first, then range of 2♂ and 2♀ paratypes. L: 6.00, 5.41-6.00, 6.08-6.91; W: 2.81, 2.34-2.44, 2.56-2.96; HL: 1.00, 0.85-0.95, 1.00-1.06; HW: 1.00, 0.83-0.84, 0.91-0.96; PL: 0.67, 0.58-0.65, 0.62-0.83; PW: 1.83, 1.54-1.72, 1.74-2.03; AS: I, 0.31, 0.28-0.31, 0.30-0.38; II, 0.35, 0.28-0.31, 0.30-0.36; III, 0.38, 0.33-0.35, 0.35-0.40; IV, 0.38, 0.44-0.36, 0.38-0.40; SL: 0.86, 0.78-0.81, 0.87-1.00; SW: 1.25, 1.00-1.03, 1.16-1.37; WL: 3.50, 2.96-3.12, 3.4-4.00; corium length: 1.10, 1.00-1.08, 1.00-1.20.

DISTRIBUTION (Fig. 14). This species is known from only 3 collections in the northern portion of the NT.

REMARKS. *Neuroctenus kapalga* is very similar to the widespread tropical species *N. handschini* and its range occupies a small area within the range of the latter.

Neuroctenus hyalinipennis australicus Kormilev, 1965 (Fig. 13G,R)

Neuroctenus serrulatus: Kormilev, 1965b:5 (misident.); Kormilev, 1967a: 532 (misident.).
Neuroctenus hyalinipennis australicus Kormilev, 1971: 77 (descr.); Kormilev & Froeschner, 1987: 169 (listed)

TYPE. Holotype ♂, Australia, Queensland, Cairns, Mjöberg coll., in NMNH (Drake Collection). Not examined but checked on my behalf by Dr R.C. Froeschner.

MATERIAL EXAMINED. 31 specimens: PAPUA NEW GUINEA: Murua River, 1♀, 21.xii.1964, J. Sedlacek, in Malaise trap, in QM; Misima Island, 2♂ 1♀, H.R. Bartlett, in SAM. NORTH QUEENSLAND: Somerset, 2♀, C.T. McNamara, in SAM; Lake Boronto, Newcastle Bay, 1♂ 1♀, 30.i.-4.ii.1975, GBM; Claudie River, 26.v.1974, M. Walford-Huggins, in QM; 14km NW Hopevale, 1♂, 8-10.x.1980, TAW; 3km NE Mt Webb, 1♂, 1-3.x.1980, TAW; Julatten, 3♂ 5♀, 18-22.viii.1982; Green Island, 2♂ 2♀, 8-15.viii.1982, in ANIC; Cairns, 1♂ 1♀; Kuranda, 1♂ 1♀, 5.xii.1920, F.P.Dodd, in QM; Cairns, 2♂ 2♀, Mjöberg, in NRS; Etty Bay, nr Innisfail, 1♂, 24.x.1980, GBM, in QM.

DESCRIPTION. Small, 5.1-5.5mm long, with transparent wing membranes and truncate paratergites. Colour pale to reddish brown.
MALE. Head with length 1.05-1.15 times width; vertex transversely rugose; supra-ocular ridges low; postocular tubercles pointed, extending beyond outer profile of eyes; antenniferous tubercles blunt, very short reaching basal 1/4 of first antennal segment; genal processes short, reaching 3/4 of first antennal segment. Rostrum short, not reaching level of hind border of eyes; rostral

groove with carinae which are well separated for whole length. Antennae with length 1.35-1.34 times head length; first 2 segments subequal, shorter than segments III and IV which are also subequal.

Pronotum with width 2.5-2.75 times median length; surface rather finely rugose; lateral margins straight; collar present as a faint rim not separated from pronotal disc by a groove; transverse depression separating fore and hind lobes present at sides, absent in middle; submedian sublateral areas flat. Scutellum with width 1.3-1.4 times length; surface longitudinally rugose on anterior half, transversely so on posterior half; median carina obsolete. Hemelytra usually reaching or slightly surpassing hind margin of Tg VI; corium reaching a little beyond hind border of Tg II, poorly sclerotised; membranes completely transparent and without visible venation.

Connexival surfaces coarsely rugose-punctate; sublateral carinae weakly present on Cx III-VI and obsolete on VII; posterior glabrous areas of Cx IV-VI elongate; inner margins of Cx IV and V straight; suture between Cx VI and VII curved; Cx margins not conspicuously double except on segment VII; carinae delimiting inner tergal disc continuous to hind border of segment VII. Pygophore with width 1.5 times length; basal half impressed on each side of middle; paratergites of VIII broad, apically truncate, with spiracles sublateral.

Thoracic sterna very smooth, minutely wrinkled; abdominal sterna finely punctate; suture between St VI and VII straight in middle then angled sharply backwards at sides before running obliquely to margins. Legs with stout femur, those of forelegs with length twice width.

FEMALE. As for ♂ except: sublateral carinae prominent on Cx III-VII; carinae delimiting inner tergal disc complete and continuous posteriorly to immediately anterior to hind margin of segment VI; hemelytra reaching to about 3/4 length of segment VI; paratergites of segment VIII short, transverse, apically truncate and with several denticles along margin; segment IX without ventral projections.

MEASUREMENTS. Ranges of 2♂ and 2♀. L: 5.17-5.50, 5.17-5.33; W: 2.20-2.32, 2.14-2.16; HL: 0.88-0.90, 0.86-0.94; HW: 0.80-0.84, 0.80; PL: 0.60-0.66, 0.60; PW: 1.60-1.70, 1.60-1.64; AS: I, 0.28, 0.26-0.28, II, 0.26-0.28, 0.28, III, 0.34, 0.34-0.36, IV, 0.32-0.36, 0.36; SL: 0.80-0.86, 0.80-0.86; SW: 1.10-1.14, 1.12-1.14, WL: 2.96-3.25, 2.92-3.08.

DISTRIBUTION (Fig. 14). From the tip of Cape York to Innisfail, north Queensland. Sri Lanka, the Philippines, Java and New Guinea.

REMARKS. The transparent wing membranes make this species very distinctive among Australian species. Kormilev (1971) recognized two subspecies: the nominotypical *hyalinipennis*, from the Philippines (type locality) and Java, which has both coria and membranes transparent; and *australicus*, from Queensland, which has the coria partly sclerotised. He mentioned an intermediate specimen from Misima Island and 3 companion specimens to those are in BPBM now in addition to a New Guinea mainland specimen identified as subsp. *australicus* by Kormilev subsequent to his publication. These specimens show coria less sclerotised than those of typical Australian specimens but are otherwise identical.

Neuroctenus crassicornis Kormilev, 1971
(Figs 4B, 5E,S,T, 12F,K,W, 13C,I,S, 16N)

Neuroctenus crassicornis Kormilev, 1971: 79 (descr., fig.); Kormilev & Froeschner, 1987: 166 (listed).
Neuroctenus vicinus: Kormilev, 1971: 96 (misident. of Aust. specimen).

TYPE. Holotype ♂, New Guinea, Papua, W. District, Oriomo Govt. Sta., 26-28.x.1960, J.L.Gressitt, IN BPBM. Examined.

MATERIAL EXAMINED. Holotype and 135 specimens: PAPUA NEW GUINEA: Oriomo Govt. Sta., W. Prov., ♀ allotype, 1♂ 1♀ paratypes, in BPBM. NORTH QUEENSLAND: Eet Hill, Moa (Banks) Island, Torres Strait, in QM; Somerset, Cape York, in QM UZMH and MCG; Lockerbie; Dividing Range, 15km W of Capt. Billy Creek; Iron Range; West Claudie R., Iron Range, in QM. (QM duplicates lodged in BMNH, ANIC, UQIC).

DESCRIPTION (based on type material). Medium-sized, 6-7mm long, without rostral groove carinae, with truncate paratergites and with black, opaque wing membrane.

MALE. Head with length about 1.1 times width; vertex transversely rugose; supra-ocular carinae low; postocular tubercles not acute, reaching outer profile of eyes; antenniferous tubercles with outer margins sub-parallel and with apices drawn out into small points; genal processes not separated, reaching apex of first antennal segment. Rostrum extending to hind margin of eyes; rostral groove shallow and without lateral carinae. Antennae with length 1.4-1.5 times head length; all segments thick, equal to or a little less in diameter than segment I; segment I with length about twice width; segment III longest, segment II and III subequal.

Pronotum with width 2.5-2.7 times median length; surface finely granular and rugose; lateral margins slightly sinuate at anterior third, with a narrow explanate margin giving anterolateral angles a somewhat angular appearance; collar very reduced, barely differentiated from disc; transverse depression weak at sides and absent medially; pronotal surface virtually flat.

Scutellum with width 1.15-1.3 times length; its surface weakly rugose, longitudinally so on anterior half and transversely so on posterior half. Hemelytra reaching wing margin of Tg VII; corium reaching just beyond hind margin of Tg II; membranes black, opaque, rather shining.

Connexival surfaces punctate; lateral margins conspicuously double, finely denticulate and longitudinally grooved; sublateral carinae weakly present on Cx III-V, becoming obsolete on VI, absent on VII; posterior glabrous areas of Cx III-VI strongly elongate; inner margins of Cx IV and V virtually straight; suture between Cx VI and VII weakly curved; carinae delimiting inner tergal continuous to hind border of segment VI. Pygophore with width 1.7 times length; its surface granular and with a depression on each side of middle of base; paratergites of VIII broad, with apices sub-truncate and with outer margins straight and contiguous with margin of Cx VII; spiracles lateral.

Thoracic sterna smooth, very finely wrinkled; abdominal sterna very finely punctate; suture between St VI and VII straight in middle then angled sharply posteriorly before extending obliquely to margin; spiracles of segments II-VII ventral. Legs with femora very stout, those of forelegs with length less than twice width; tibiae with double row of small tubercles along dorsal surface.

Parameres as in Fig. 12W.

FEMALE. As for ♂ except: sublateral carinae distinct on Cx III-VI, weak on VII; carinae delimiting inner tergal disc reaching to about 3/4 length of Tg VI; hemelytra extending to half length of Tg VI; paratergites of segment VIII short, transverse, truncate, with apices denticulate; spiracles lateral; segment IX without ventral projections.

MEASUREMENTS. Holotype ♂ first, then paratype ♀, then ranges of additional 2 Australian ♂♂ and ♀♀. L: 6.17, 7.00, 6.00-6.17, 6.17-6.50; W: 2.80, 3.25, 2.75-2.83, 2.92-3.00; HL: 1.10, 1.20, 1.00-1.02, 1.10; HW: 1.02, 1.04, 0.96-0.98, 0.94-1.00; PL: 0.72, 0.80, 0.68-0.72, 0.70-0.72; PW: 1.80, 1.96, 1.82-1.96, 1.82-1.86; AS: I, 0.36, 0.40, 0.34, 0.32-0.38; II, 0.40, 0.44, 0.34-0.36, 0.38-0.40; III, 0.50, 0.52, 0.44, 0.48-0.50; IV, 0.36, 0.36, 0.34, 0.38; SL: 1.00, 1.10, 0.94-0.96, 1.00-1.10; SW: 1.24, 1.28, 1.20-1.30, 1.26-1.30; WL: 4.00, 4.17, 3.67-3.75, 3.92.

DISTRIBUTION (Fig. 14). This rainforest species occurs in northern Cape York Peninsula and on Moa Island in Torres Strait. It is also known from New Guinea and the Philippines.

REMARKS. This is the species' first record from Australia although a series of specimens collected at Somerset in 1875 by L.M. D'Albertis have been sighted by several authors (Bergroth, 1887; Kormilev, 1971) and referred to as *Neuroctenus vicinus*. This series was collected on the same expedition as was the type material of *N. vicinus* (from New Guinea) and although it was presumably before Signoret when he described *N. vicinus* (Signoret, 1880) he, himself, did not include it as *N. vicinus*. However, the Somerset specimens are similar superficially to *N. vicinus* and appear to have been distributed as that species. I have located 2 of these D'Albertis specimens, a ♂ in the Genoa collection standing beside the Holotype of *N. vicinus*, and a ♀ in the Helsinki collection. The latter is named *Neuroctenus vicinus* in Bergroth's hand and is presumably the specimen on which he based his redescription of *N. vicinus* and his inclusion of 'Australian borealem (Cape York)' in its distribution (Bergroth, 1887); the same specimen is cited by Kormilev (1971) as *N. vicinus*. However these old Somerset specimens belong to the same species of which I have a long, modern series from the vicinity of Somerset and which are identical with the type series of *crassicornis* from southern New Guinea. Heiss (1989b) selected and illustrated a lectotype for *N. vicinus*, thus stabilising its identity.

Neuroctenus par Bergroth, 1887
(Figs 5D, 12C,V, 13A,V)

Neuroctenus par Bergroth, 1887: 180 (descr.); Lethierry & Severin, 1896: 45 (listed); Kormilev, 1953: 342 (locality records); Usinger & Matsuda, 1959: 273 (listed); Blöte, 1965: 21 (locality records); Kormilev, 1971: 70 (included in key; locality records); Kormilev & Froeschner, 1987: 172 (listed).

TYPE. 'Java, Mus. Berol., Coll. Signoret'. Not located.

MATERIAL EXAMINED. 48 specimens: PAPUA NEW GUINEA: Bulolo-Watut, 1♂, 1-7.vi.1968, J. Sedlacek; Wau, Hospital Creek, 1♀, 27.i.1966, J. Sedlacek, in QM. NORTH QUEENSLAND: Lockerbie, Cape York, 4♂ 6♀, 13-27.iv.1973, GBM, 1♀, 6-10.vi.1969; Iron Range, 1♀, 1-9.vi.1971, GBM, 2♂ 2♀, 28.iv.-4.v.1968, GBM, 1♂ 1♀, 11-17.v.1968, GBM; West Claudie R., Iron Range, 9♂ 5♀, 3-10.xii.1986, GBM & DJC, in QM; 14km NW Hopevale, 10♂ 4♀, 8-10.x.1980, TAW, in ANIC & QM. (QM duplicates lodged in BMNH, UQIC).

DESCRIPTION (based on Australian material). Medium sized, 6.1-7.2mm long, with rostral groove closed behind and a distinct pronotal collar. Dark yellowish brown.

MALE. Head with length 1.1 times width; vertex coarsely rugose-granular; supra-ocular carinae pronounced; postocular tubercles short, not reaching outer profile of eyes, apically blunt, with several granules; antenniferous tubercles almost parallel sided, apically with a small point; anterior process of head long, reaching almost to apex of first antennal segment. Rostrum short, not reaching level of posterior border of eyes; rostral groove deep, with marginal carinae meeting behind rostral apex. Antennae with length 1.45-1.55 times head length; segments I and III subequal, longer than segments II and IV which are also subequal.

Pronotum with width 2.1-2.3 times median length; its surface sparsely granular; lateral margins slightly sinuate, anterior 2/3 with a denticulate, explanate rim; collar large, smooth, set off from disc by a distinct groove; pronotal surface flat with transverse depression present laterally; anterior lobe with a faint median sulcus. Scutellum with width 1.15-1.25 times length; surface with a tri-radiate, faint pattern of ridges on disc; surface with some longitudinal rugae in middle of anterior half and with faint transverse rugae on posterior half. Hemelytra reaching to hind margin of Tg VI; coria reaching to hind margin of Tg III; membranes opaque, black, shining.

Connexival surfaces finely punctate; sublateral carinae obsolete on all connexiva; inner margins of Cx IV and V slightly sinuate; suture between Cx VI and VII straight; carinae delimiting inner tergal disc complete posteriorly to hind margin of VI; posterior glabrous areas of Cx somewhat elongate or subcircular; lateral margins not conspicuously double and grooved. Pygophore with width 1.6 times length; dorsum with a triangular impression; paratergites of VIII flat, apically expanded on mesal side; spiracles sublateral. Parameres (Fig. 12V).

Thoracic sterna smooth, finely wrinkled; abdominal sterna smooth; spiracles of II-VII ventral; suture between St VI and VII straight in middle then extending obliquely to margins. Legs with femora rather stout, those of forelegs with length 2.1 times width.

FEMALE. As for ♂ except: sublateral carinae weak, on Cx III-VI, obsolete on VII; hemelytra reaching apical 3/4 of Tg VI; carinae delimiting inner tergal disc reaching hind margin of VI; paratergites of VII apically rounded, not reaching apex of segment IX; segment IX long, with 2 short, subcontiguous, ventral projections.

MEASUREMENTS. Ranges of 2♂ and 2♀. L: 6.17-6.33, 7.17-7.50; W: 2.75-3.00, 3.08-3.16; HL: 1.00-1.10, 1.14-1.16; HW: 0.90-0.98, 1.00-1.02; PL: 0.88-0.92, 0.98-1.00; PW: 1.90-2.06, 2.10-2.16; AS: I, 0.42-0.44, 0.42-0.44; II, 0.36-0.38, 0.40, III, 0.42-0.46, 0.44-0.48, IV, 0.38-0.40, 0.40-0.42; SL: 1.06-1.12, 1.20; SW: 1.22-1.34, 1.40-1.48; WL: 3.58-3.92, 4.00-4.17.

DISTRIBUTION (Fig. 14). The species is known from the rainforests of Iron Range and Lockerbie in the far north of Cape York Peninsula with one record from just N of Cooktown. The species also occurs in SE Asia, Java (type locality), Borneo, Philippines, New Guinea, Bismarck Archipelago and the Solomons.

REMARKS. This widespread species is here recorded for the first time from Australia. Australian material runs directly to *par* in Kormilev's (1971) key and agrees with New Guinea material determined by Kormilev. *Neuroctenus par* is similar in size and colour to *N. crassicornis* with which it occurs at both Lockerbie and Iron Range. The two species are readily separated by the truncate paratergites and lack of rostral carinae in *N. crassicornis*.

Neuroctenus eurycephalus Kormilev, 1971 (Figs 5G, 12E,T)

Neuroctenus eurycephalus Kormilev, 1971: 86 (descr., fig.); Kormilev & Froeschner, 1987: 167 (listed).

TYPE. Holotype ♂, New Guinea, Brown River, E of Port Moresby, 100m, June 8, 1955, J.L. Gressitt, in BPBM. Examined.

MATERIAL EXAMINED. Holotype and 50 specimens: NEW GUINEA: Brown River, E of Port Moresby, 100m, ♀ allotype, 8.vi.1955, J.L. Gressitt, in BPBM; Oriomo Govt. Sta., W. District, 1♀, 26-28.x.1960, J.L. Gressitt, in ANIC. NORTH QUEENS-

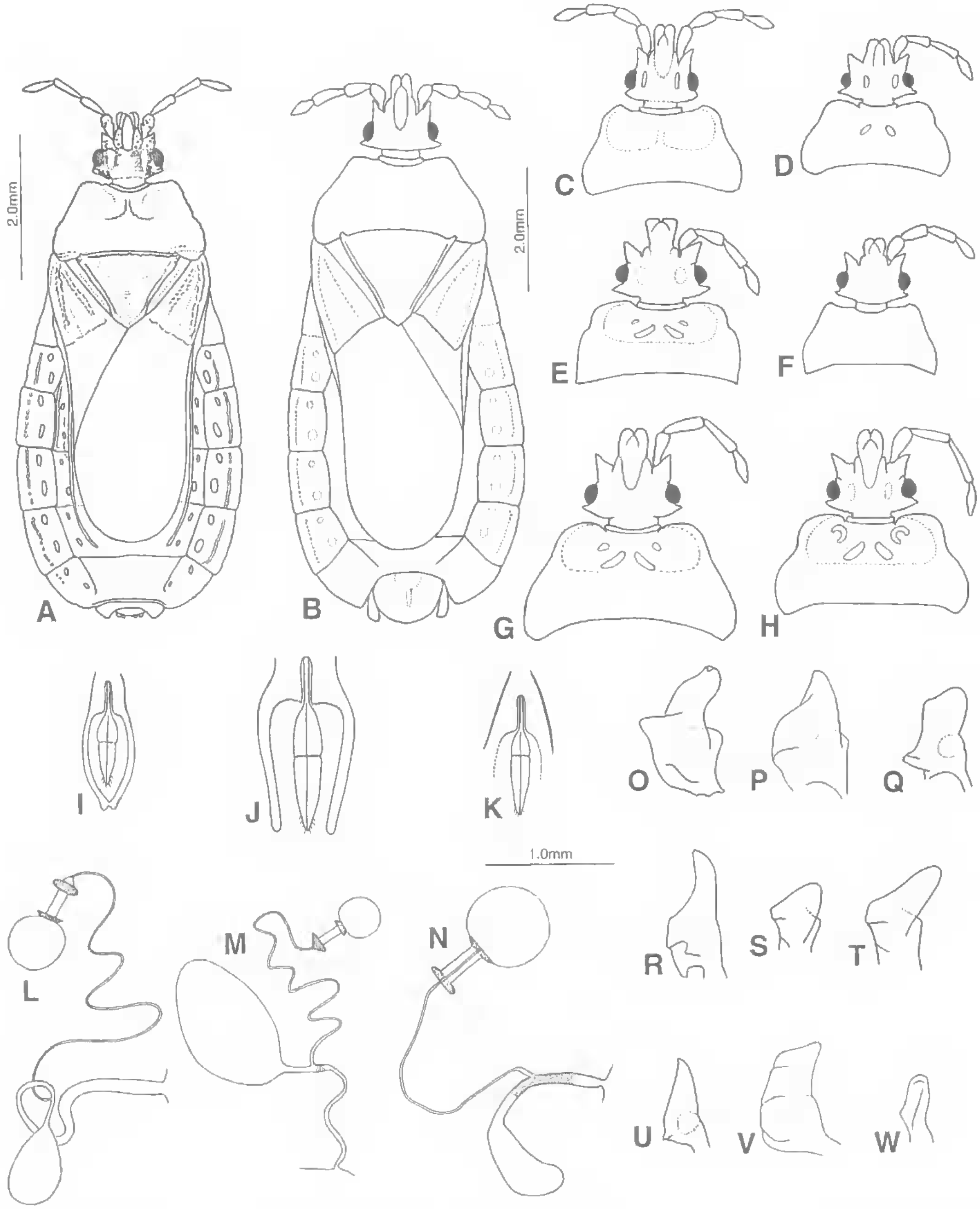

FIG. 12. *Neuroctenus* spp., A, *N. kapalga* ♀; B, *N. occidentalis* ♂; C, *N. par*; D, *N. handschini*; E, *N. eurycephalus*; F, *N. crassicornis*; G, *N. proximus*; H, *N. grandis*; I-K, rostral region of head; I, *N. handschini*; J, *N. proximus*; K, *N. crassicornis*; L-N, spermathecae; L, *N. proximus*; M, *N. yorkensis*; N, *N. grandis*; O-W, left parameres, inner view; O, *N. proximus*; P, *N. grandis*; Q, *N. woodwardi*; R, *N. occidentalis*; S, *N. yorkensis*; T, *N. eurycephalus*; U, *N. handschini*; V, *N. par*; W, *N. crassicornis*

LAND: Moreton Telegraph Station, 5♂ 2♀, 30.vi.1975, GBM; Iron Range, 11-17.v.1968, GBM, 1♀, 1.v.1975, M.S. Moulds, 1♀, 12-18.ii.1976, GBM; Shipton's Flat, 250m, 35km S Cooktown, 11♂ 16♀, 22.iv.1982, GBM, DKY & DJC; Port Douglas, 1♂ 1♀, 28.x.1987, G.Hughes, in QM; Station Creek, 11 ml N of Mt Molloy, 3♂ 7♀, 18.xi.1969, J.G. Brooks, in ANIC.

DESCRIPTION (based on types and Australian material). Coarsely-textured, medium-sized, dark, 6.1-6.9mm long, with spiracles of segments VII and VIII lateral. Body not strongly flattened.

MALE. Head usually a little longer than wide; vertex coarsely granulate; supra-ocular ridge prominent and denticulate; postocular tubercles long, straight, apically pointed, extending beyond outer profile of eyes; antenniferous tubercles granular, divergent, blunt; genal processes subcontiguous, widened apically, surpassing apex of first antennal segment. Rostrum long, extending a little beyond hind margin of rostral groove; rostral groove with prominent lateral carinae which do not meet posteriorly. Antennae 1.3-1.45 times head length; first two segments subequal, shorter than segments III and IV which are also subequal.

Pronotum with width 2.2-2.35 times median length; surface granular; lateral margins distinctly sinuate at anterior third; angles produced into small, rounded, explanate lobes; collar distinct and separated off by a sulcus; transverse depression separating fore and hind lobes more or less complete; submedian areas of forelobe with crescentic glabrous calli present on each side of an indistinct median sulcus; sublateral areas slightly inflated. Scutellum with width 1.34-1.43 times length; surface granular; a median ridge present for whole length. Hemelytra extending to a little beyond hind border of Tg VI; coria reaching to almost half length of Tg III; membranes with basal fifth white and remainder opaque and black.

Connexival surfaces coarsely punctate; sublateral carinae obsolete on all connexiva; posterior glabrous areas of Cx III-VI subcircular; inner margins of Cx IV and V straight; suture between Cx VI and VII straight; lateral margins of abdominal Cx not conspicuously double; carinae delimiting inner tergal disc continuous posteriorly to hind margin of segment VI. Pygophore with width about 1.5 times length, its apex narrowed; basal half with a narrow, median, triangular impression; paratergites of VIII with spiracles clearly lateral and with mesal side of apices strongly produced into a rounded lobe.

Prosternum coarsely punctate; meso- and metasterna rugose; abdominal sterna coarsely punctate at sides and more finely so medially; suture between St VI and VII straight across middle and angled posteriorly at sides; spiracles of segments II-VI ventral, those of VII lateral and visible from above. Legs with femora stout, those of fore legs with length a little over twice width.

Parameres as in Fig. 12T.

FEMALE. As for ♂ except: sublateral carinae irregularly developed on Cx III-VI, usually only on posterior half of segment, absent on VII; hemelytra reaching just beyond half length of Tg VI; carinae delimiting inner tergal disc more or less complete around margin of wings; paratergites of VIII with angulate apices and lateral spiracles; segment IX with a pair of short, widely-spaced ventral projections.

MEASUREMENTS. Holotype ♂ first, then allotype ♀, then ranges of additional 2 Australian ♂ and ♀. L: 6.17, 6.83, 6.00-6.33, 6.67-6.83; W: 2.75, 3.25, 2.58-2.75, 2.83-2.92; HL: 1.16, 1.34, 1.06-1.12, 1.19-1.26; HW: 1.14, 1.26, 1.12-1.14, 1.22-1.24; PL: 0.90, 1.06, 0.88-0.90, 0.90-0.94; PW: 2.10, 2.36, 1.96-2.06, 2.18-2.36; AS: I, 0.38, 0.42, 0.30-0.34, 0.36-0.38; II, 0.38, 0.42, 0.34-0.36, 0.40-0.42; III, 0.46, absent, 0.44-0.46, 0.46-0.50; IV, 0.44, absent, 0.38-0.42, 0.44-0.46; SL: 1.00, 1.16, 0.92-1.00, 1.00-1.04; SW: 1.34, 1.56, 1.32-1.34, 1.40-1.42; WL: 3.50, 4.08, 3.33-3.58, 3.67-3.92.

DISTRIBUTION (Fig. 14). Cape York Peninsula as far south as Mount Molloy and Port Douglas, New Guinea, the Bismarck Archipelago and the Solomon Islands.

REMARKS. This species has not been reported from Australia previously. It has been taken in rainforest with the exception of the series from Station Creek. It is closely related to *N. yorkensis* sp. nov., and the two are the only Australian representatives of the section of *Neuroctenus* with lateral spiracles on segment VII and body not strongly flattened.

Neuroctenus yorkensis sp. nov.
(Figs 4A, 5F, 12M,S, 13F,M,P)

TYPE. Holotype ♂, north Queensland, Cooper Creek, 18ml N of Daintree River, 21-22.vi.1969, G.B. Monteith, QMT11654.

MATERIAL EXAMINED. Holotype and 72 paratypes: NORTH QUEENSLAND: 1 ml NE Mt Lamond, Iron Range, 1♀, 26.xii.1971, McAlpine, Holloway & Sands, in AM; West Claudie R., Iron Range, 2 ♂ 3♀, 10.xii.1985, GBM, DKY & DJC;

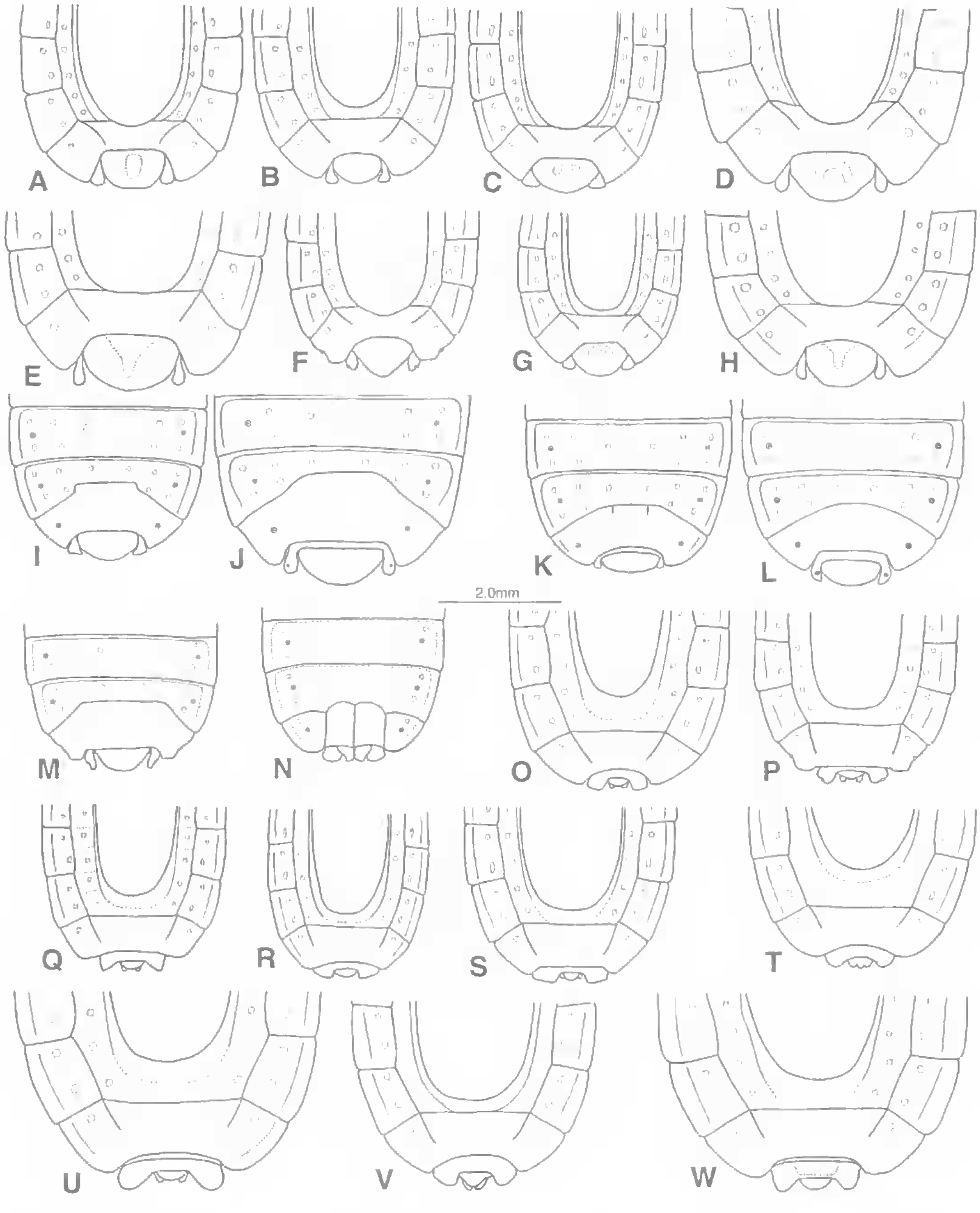

FIG. 13. *Neuroctenus* spp., abdominal apices, dorsal (d) and ventral (v). A, *N. par* ♂ d; B, *N. handschini* ♂ d, C, *N. crassicornis* ♂ d; D, *N. proximus* ♂ , d; E, *N. gracilis* ♂ d; F, *N. yorkensis*, ♂ d; G, *N. hyalinipennis* ♂ d; H, *N. grandis* ♂ d; I, *N. crassicornis* ♂ v; J, *N. proximus* ♂ v; K, *N. woodwardi* ♂ v; L, *N. occidentalis* ♂ v; M, *N. yorkensis* ♂ v; N, *N. handschini* ♀ v; O, *N. handschini* ♀ d; P, *N. yorkensis* ♀ d; Q, *N. gracilis* ♀ d; R, *N. hyalinipennis* ♀ d; S, *N. crassicornis* ♀ d; T, *N. woodwardi* ♀ d; U, *N. proximus* ♀ d; V, *N. par* ♀ d; W, *N. grandis* ♀ d.

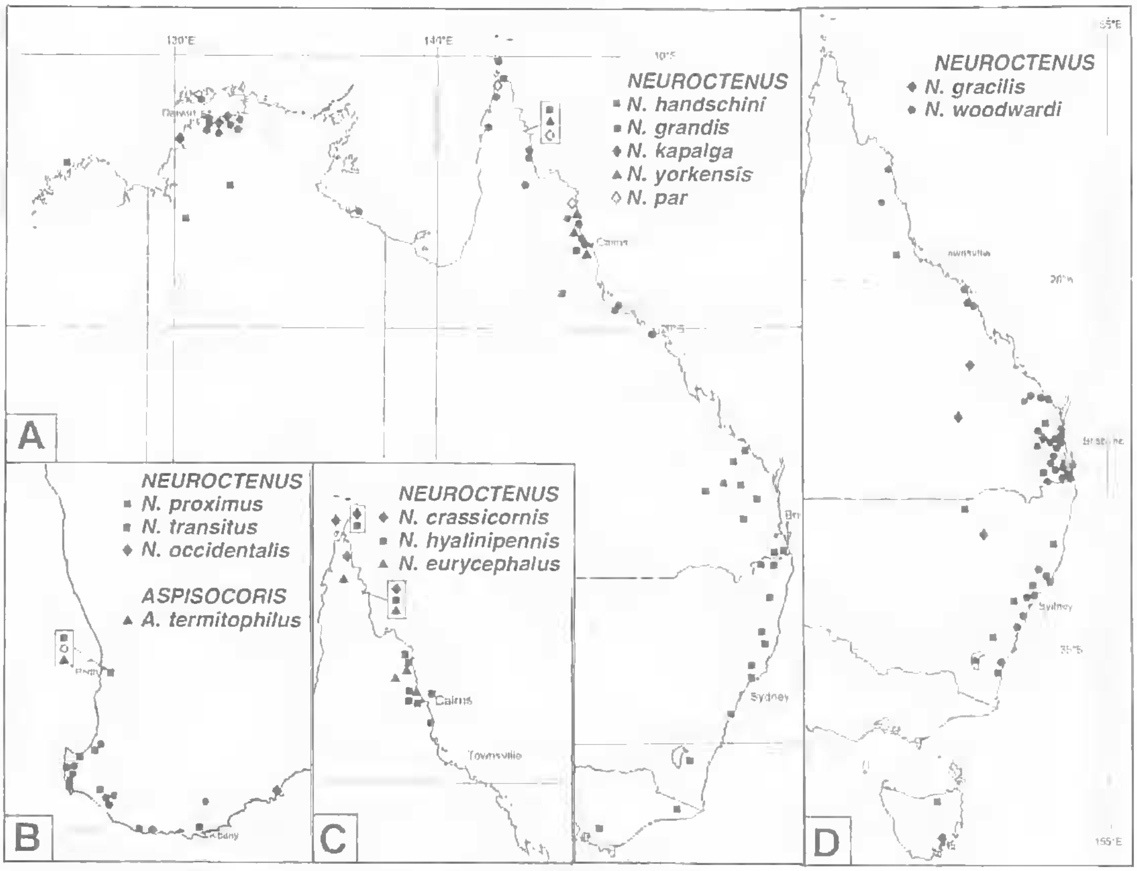

FIG. 14. Records for species of *Neuroctenus* and *Aspisocoris* in Australia.

Portland Roads, 9♂ 9♀, 6.xii.1985, GBM & DJC Coen, Cape York Pen., 6♂ 10♀, 10.xii.1964, GBM; Cooper Creek, 18 ml N of Daintree River, 16♂ 7♀, 21-22.vi.1969, GBM; Upper Daintree River, via Daintree, 4♂, 27.xii.1964, GBM; Ellis Beach, via Cairns, 1♂ 4♀, 28.xii.1964, GBM; Crystal Cascades, via Redlynch, 2♂, 29.xi.1965, GBM; Gordonvale, 1♂, 1.vi.1967, A. Macqueen, in QM. (QM duplicates lodged in BMNH, ANIC, SAM, NRS, UQIC) (QM paratypes: QMT14930-14963, 26308-26337).

DESCRIPTION. Small, coarsely textured, dark, 5.1-6.2mm long, with spiracles of segments VII and VIII lateral and body not strongly flattened. This species is very closely related to *N. eurycephalus* and the following description is restricted to differences from that species.

MALE. Smaller, 5.1-5.8mm long; postocular tubercles narrower and slightly shorter; pronotum shorter and broader, width equalling 2.4-2.7 times median length; anterolateral pronotal angles less expanded; pygophore with dorsal impression shallow and broader; parameres (Fig. 12S) with apices much shorter and broader.

FEMALE. As for ♂ except: size smaller than *N. eurycephalus*, 5.7-6.2mm long. Spermatheca as in Fig. 12M.

MEASUREMENTS. Holotype ♂ first, then ranges of additional 2 paratype ♂ and ♀. L: 5.42, 5.17-5.83, 5.83-6.17; W: 2.33, 2.20-2.50, 2.67-2.92; HL: 0.94, 0.90-1.06, 1.04-1.12; HW: 0.96, 0.92-1.14, 1.00-1.08; PL: 0.74, 0.70-0.86, 0.82-0.90; PW: 1.96, 1.90-1.96, 1.96-2.16; AS: I, 0.30, 0.28-0.30, 0.30-0.34; II, 0.30, 0.30-0.36, 0.34-0.36; III, 0.38, 0.36-0.42, 0.40-0.44; IV, 0.36, 0.36, 0.38-0.40; SL: 0.82, 0.82-1.00, 0.94-1.00; SW: 1.14, 1.12-1.24, 1.34-1.40; WL: 3.00, 2.92-3.33, 3.42-3.67.

DISTRIBUTION (Fig. 14). Cairns to Iron Range in the southern half of Cape York Peninsula in both rainforest and open forest.

REMARKS. The range of this species overlaps with that of its close relative, *N. eurycephalus*, in the southern portion of the range of the latter. The two are easily separable only by structural features of the male, especially the shape of the parameres. Overall size seems to be quite a reliable differentiation as each species is known from quite long series with little size variation in each. Isolated females may be difficult to place and 3 in QM cannot be assigned at present (Lockerbie; 4km E of Lockerbie; Captain Billy Creek).

Ctenoneurus Bergroth, 1887

Ctenoneurus Bergroth, 1887: 188 (descr.); Usinger & Matsuda, 1959: 198,266 (incl. in key; redescr.); Kormilev, 1971: 4,8,49 (relationships; incl. in key; key to spp.); Lee & Pendergrast, 1977: 167 (brief descr.); Kormilev & Froeschner, 1987: 130 (catalogue of spp.).

TYPE SPECIES. *Neuroctenus hochstetteri* Mayr, 1866 (New Zealand), designated by Usinger & Matsuda, 1959.

DISTRIBUTION (Fig. 8B). *Ctenoneurus* has two centres of diversity: the Africa/Malagasy region with a minor radiation of 11 species, and the Indo-Pacific region with a major radiation of 34 species, particularly in the eastern sector.

REMARKS. *Neuroctenus* and *Ctenoneurus* are closely related with some intermediate types occurring. The two genera show contrasting patterns of distribution. Whereas *Neuroctenus* is cosmopolitan with the principal proliferations of species occurring on the continental land masses, *Ctenoneurus* does not extend to either the Palaearctic or the New World and has its species proliferations on the insular land masses of the Indo-Pacific where its overall distribution exceeds greatly that of *Neuroctenus*. For example, some of these insular faunas are: Fiji, 5 spp.; New Caledonia, 5 spp.; New Guinea, 6 spp.; New Zealand, 3 spp.

Neuroctenus, by contrast, does not extend into the Pacific east of the Solomons except for an isolated occurrence on Samoa. The question arises as to whether *Ctenoneurus* on these islands represents overseas colonization or relicts from former more extensive land masses. The minor radiations on such 'continental' islands as Fiji, New Caledonia and New Zealand, with few or no species on many of the younger islands such as the Solomons and Vanuatu, indicates a relict status for the group in the Melanesian arc region. In Australia the genus has 3 rare species 2 of which occur in wet tropical Queensland and 1 in the wet subtropics of south Queensland/northern NSW. These are the regions where numerous other links with the Melanesian arc fauna occur.

KEY TO THE AUSTRALIAN SPECIES OF *CTENONEURUS*

1. Head distinctly longer than width across the eyes; abdominal terga without a prominent ridge bordering the hemelytral membranes; pygophore of male with a narrow, elongate dorsal impression (North Queensland) 2
   Head about as long as width across eyes; abdominal terga raised into a prominent, rugose ridge bordering the hemelytral membranes; pygophore of male with a sub-circular dorsal impression (South Queensland, NSW) . . . . *meridionalis*, sp.nov.

2(1). Body narrow and elongate, with total length four times maximum body length; apex of scutellum with three prominent teeth; margins of Cx VI tubercular . . . . *robertsi*, sp.nov
   Body broader, total length less than four times maximum width; apex of scutellum with two weak teeth; margins of Cx VI smooth . . . . *australis* Kormilev

Ctenoneurus australis Kormilev, 1965 (Figs 4D, 5H, 7D, 16B, 16F-J)

Ctenoneurus australis Kormilev 1965b: 3 (descr., fig.); Kormilev, 1971: 51 (incl. in key); Kormilev & Froeschner, 1987: 130 (listed).

TYPE. Holotype ♀, Malanda, Queensl., Mjöberg, in NRS. Examined. The type lacks the apical 2 segments of the right antenna and the tarsi of all legs except the left rear.

MATERIAL EXAMINED. Holotype and 36 specimens: NORTH QUEENSLAND: Gap Creek, 8km N of Bloomfield River, 100', 1♀, 8-9.v.1970, GBM, in QM; 6km S Kuranda, intercept trap, 1♂ 1♀, 10.xii.1984-15.i.1985, RIS & K.Halfpapp, in MDPI; Tolga, 1♂, 10.v.1970, GBM; Davies Creek Rd, 800m, 4♂, 25.xii.1988, H.& A.Howden, 1♀, pyrethrum, 17.xii.1989, GBM,GIT; 21 km S Atherton, 1040-1100m, 1♀, 5.xi.1983, DKY & GIT; North Bell Peak, 10 km E Gordonvale, 900-1000m, 1♀, 13.x.1982, GBM, DKY & GIT, in QM; Bellenden Ker, 1♂ allotype, Mjöberg, in NRS; Upper Mulgrave River, 2♂ 1♀, 30.iv.1970, GBM; Millaa Millaa Falls, 3♂, 11.viii.1968, TAW; Baldy Mountain road, 8 km SW of Atherton, 4000', 1♂ 1♀, 11.v.1970, GBM, 7♂ 8♀, 24.iv.1970, GBM; Kirrama Ra., Douglas Ck Rd, 800m, 1♀, 9-12.xii.1986, GBM, GIT & S.Hamlet, in QM. (QM duplicates lodged in BMNH, SAM, EH, UQIC).

DESCRIPTION. Small, elongate, 5.2-6.2mm long, with head longer than wide, with a narrow dorsal impression on the ♂ pygophore.

MALE. Head with length 1.15-1.25 times width across eyes; vertex densely and finely granular; postocular processes broad, obtuse-angled and not reaching outer profile of eyes; supra-ocular carinae low and continuous; antenniferous tubercles slightly divergent, apically blunt and reaching basal 1/3 of first antennal segment; clypeus elongate with genae short, subcontiguous, barely exceeding clypeal apex and bent downwards somewhat. Rostrum reaching on to fore border of prosternum; rostral groove broad, with lateral carinae convex and not enclosing groove posteriorly. Antennae 1.24-1.33 times length of head; segment I inflated basally on mesal side; segments I-III subequal but progressively increasing slightly in length; segment IV longest, about 1.3 times length of III.

Pronotum with maximum width twice median length; surface rugose-punctate on anterior lobe, granular at transverse depression and smooth on posterior lobe; anterior lobe usually with median, longitudinal groove and with 2 crescentic smooth calli on each side of middle; collar narrow and separated by a distinct furrow; lateral margins slightly carinate on anterior half; posterior margin almost straight. Scutellum with width 1.23-1.32 times length; surface raised and punctate on anterior half, depressed and irregularly, transversely rugose on posterior half; weak median ridge on posterior half; anterior angles each with a tooth projecting forward over hind margin of pronotum; lateral margins carinate; apex subtruncate. Hemelytra with coria reaching to half length of Cx III; membrane smooth, dark with pale basal strip, reaching to middle of Tg VII.

Abdomen with sides subparallel; dorsal connexival plates sparsely punctured; Cx II and III fused; suture between Cx III/IV angled posteriorly, sutures between IV/V and V/VI angled anteriorly; margin of segment VII conspicuously split into two; inner tergal disc delimited by an indistinct ridge on segments IV and V becoming obsolete posteriorly. Pygophore with width 1.25-1.50 times length, its dorsum with a narrow, deep depression on anterior half. Parameres as in Fig. 16J. Paratergites of segment VIII short, cylindrical, obliquely truncate apically and with spiracles terminal.

Thoracic sterna finely rugose with median, longitudinal smooth bands on meso- and metasterna; abdominal St III-VI coarsely punctate; St II-VII each with a smooth, median, longitudinal callus; suture between St VI and VII straight in middle and angled posteriorly at sides; spiracles of segments II-VII all ventral and equidistant from lateral margin.

FEMALE. As for ♂ except: dorsal connexival plates more coarsely punctate and with faint sublateral ridges present on segments IV-VI; hemelytra reaching to hind margin of Tg VI; paratergites of VIII broad and truncate with spiracles apical; hind margin of St VI not trisinuate, with lateral portions more or less straight. Spermatheca (Fig. 16I) with duct long, thin walled, enlarged over basal two thirds.

MEASUREMENTS. Holotype ♀ first, then ranges of additional 3♂ (including Allotype) and 2♀. L: 6.00, 5.33-5.83, 6.00-6.17; W: 2.08, 1.72-2.04, 2.06-2.15; HL: 1.14, 1.04-1.10, 1.10-1.14; HW: 0.96, 0.84-0.94, 0.92-0.96; PL: 0.98, 0.80-0.90, 0.92-0.98; PW: 1.96, 1.66-1.86, 1.86-1.96; AS: I, 0.30, 0.26-0.28, 0.30; II, 0.32, 0.26-0.32, 0.30-0.32; III, 0.36, 0.34, 0.34-0.36; IV, 0.48, 0.44-0.46, 0.44-0.46; SL: 0.94, 0.78-0.90, 0.90-0.96; SW: 1.24, 0.96-1.12, 1.10-1.20; WL: 3.50, 3.00-3.50, 3.42-3.58.

DISTRIBUTION (Fig. 17). Under bark in lowland and highland rainforests of the wet tropics from a little south of Cooktown to the the Kirrama Range.

REMARKS. Although of normal subcortical habits, *C. australis* is rarely encountered. More than 50 years elapsed between the collection of the types by Eric Mjöberg in 1910-1913 and subsequent collection by specialist aradid collectors in recent times. The species has been taken in numbers only at higher elevations.

Ctenoneurus meridionalis sp. nov. (Figs 15, 16C-E,K)

TYPE. Holotype ♂, Bunya Mountains, SE Qld., 17-18.ix.1966. G. Monteith, QMT11655.

MATERIAL EXAMINED. Holotype and 19 paratypes; SOUTH QUEENSLAND: Forest Station, Bulburin SF, 2000', 1♀, 12-15.iv.1974, I.D. Naumann; Mt Fort William, 6 km E Kalpowar, 700m, 1♀, 18.ix.1989, GBM, in QM; Imbil, 1♂, A.R. Brimblecombe, in QDPI; Montville, 1♂, 17.x.1966, GBM; Bunya Mts., 5♂ 2♀, 17-18.ix.1966, GBM; Tomewin Range, Upper Currumbin, 1♀, pyrethrum, 19.x.1989, GBM, in QM. NEW SOUTH WALES: Wilson Park, 3 km SE Lismore, 50m, 1♀, 25.viii.1982, in QM; Bruxner Park, Coffs Harbour, 200 m, rainforest log litter, 3♂ 2♀, 9.vii.1978, SJP, in ANIC & QM; Vic

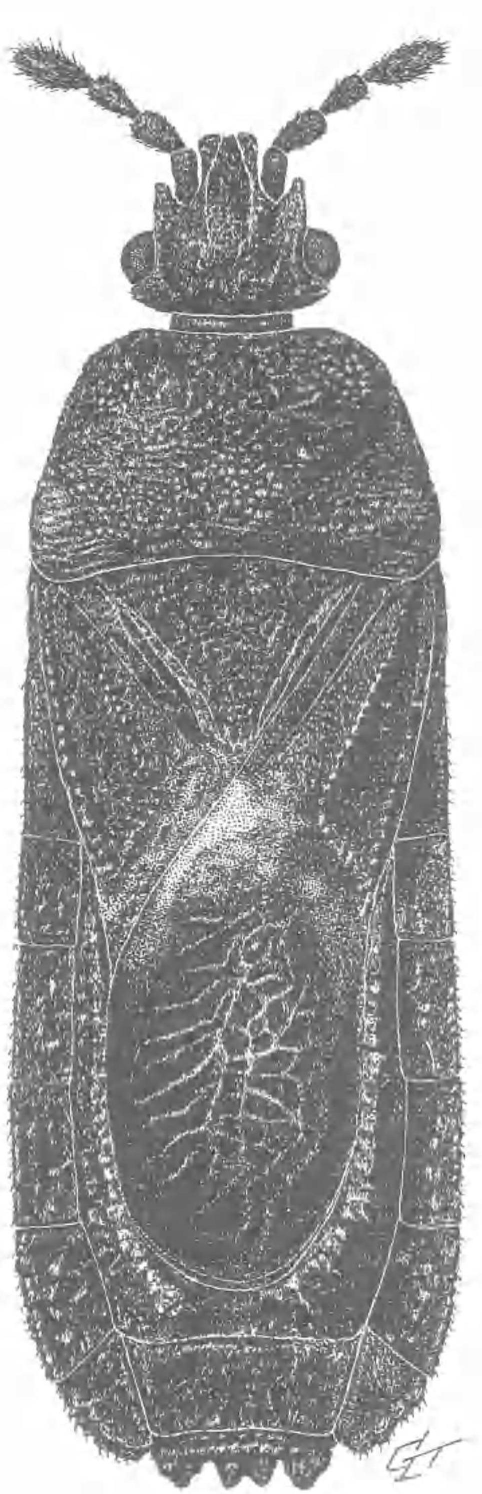

FIG. 15. Dorsal view of ♀ paratype *Ctenoneurus meridionalis*.

Breakneck Lookout, Kiwarrak SF, S Taree, 1♀, ex *Heritiera actinophyllum*, 29.xi.1989, G.A.Williams, in QM; Tweed River, 1♂, Lea; Otford, 1♀, 8.xii.1957, C.E.Chadwick, in BCRI; Mountain Lagoon, Blue Mts, 1♀, 22.iv.1984, R. de Keyzer, in UQIC. (QM duplicates lodged in BMNH, SAM, EH) (paratypes: QMT26475-26485).

DESCRIPTION. Small, elongate, 5.0-5.8mm long, with head about as long as wide, and with a broad dorsal impression on the ♂ pygophore.

MALE. Head width equal to, or slightly greater than length; vertex coarsely granulate; supraocular carinae well-developed and crenulate; postocular processes bluntly pointed, usually reaching outer profile of eyes; antenniferous tubercles parallel-sided, blunt, extending to almost half length of first antennal segment; genae slightly expanded, blunt, reaching beyond apex of first antennal segment. Rostrum just reaching anterior margin of prosternum; rostral groove broad with lateral carinae convex, not meeting posteriorly. Antennae 1.15-1.25 times head length; segments I-III subequal, segment IV longest.

Pronotum with maximum width 1.7-1.85 times median length, surface fairly uniformly granular; transverse depression between fore and hind lobes almost complete; fore lobe without median longitudinal groove and usually with 2 crescentic glabrous calli on each side of middle; collar very narrow but separated off by a distinct groove. Scutellum with width 1.15-1.25 times length; its surface coarsely granulate and with weak median ridge on posterior half; anterior angles each with an acute tooth projecting over pronotal margin; lateral margins carinate, apex subtruncate. Hemelytra with coria reaching to half length of segment III; membranes dark with pale bases, reaching to middle of Tg VII.

Abdomen with dorsal connexival plates punctured; Cx II and III fused; margin of Cx VII weakly split adjacent to paratergites of VIII; boundary of inner tergal disc of segments IV-VI marked by a raised ridge which terminates posteriorly at hind border of VI. Pygophore width 1.75 times length; its dorsum with a broad, circular impression on basal half. Parameres as in Fig. 16K. Paratergites of segment VIII short, cylindrical, with spiracles terminal and with mesal side of apices slightly produced.

Thoracic sterna finely rugose with median smooth bands on meso- and metasterna; abdominal St III-VI finely rugose; St II-VI with median, longitudinal smooth bands; suture between St VI and VII uniformly rounded; all spiracles ventral and equidistant from lateral margins.

FEMALE. As for ♂ except: dorsal connexival plates more coarsely rugose and with irregular sublateral carinae present on segments IV and V; hemelytra reaching to half length of segment VI; ridge surrounding inner tergal disc hypertrophied into a strongly raised, rugose carina surrounding hemelytral membranes but interrupted in the midline of Tg VI; paratergites of VIII broad, angularly truncate with terminal spiracles; hind margin of St VI trisinuate, with lateral portions curved.

MEASUREMENTS. Holotype ♂ first, then ranges of additional 2♂ and 2♀. L: 5.00, 5.17, 5.33-5.83; W: 1.70, 1.74-1.76, 1.82-2.00; HL: 0.86, 0.86-0.90, 0.86-0.98; HW: 0.88, 0.88-0.90, 0.90-1.00; PL: 0.88, 0.88-0.94, 0.96-1.06; PW:1.60, 1.60-1.62, 1.70-1.86; AS: I, 0.22, 0.22-0.24, 0.24-0.26; II, 0.22, 0.22-0.24, 0.22-0.26; III, 0.22, 0.20-0.22, 0.22, 0.24; IV, 0.38, 0.36, 0.38-0.40; SL: 0.80, 0.80, 0.84-0.88; SW: 0.90, 0.96-1.00, 1.00-1.06; WL: 2.83, 2.92-3.00, 3.08-3.33.

DISTRIBUTION (Fig. 17). Subcortically in rainforest, principally on plateaus, from a little south of Gladstone, S Queensland to the Blue Mountains west of Sydney. It occurs almost down to sea level in such places as Wilson Park and Bruxner Park.

REMARKS. Although widespread in the most intensively collected part of Australia this species has been rarely encountered. It is superficially similar to *C. australis* but differs particularly in the development of the high tergal ridge surrounding the hemelytral membranes in the ♀ which is striking and not seen in any other member of the genus.

Ctenoneurus robertsi sp.nov.
(Fig. 16A)

TYPE. Holotype ♂, Mossman Bluff Track, 5-10km W Mossman, N.Qld, 20 Dec 1989 - 15 Jan 1990, Monteith, Thompson, ANZSES, Site 10, 1300m, flt.intercept., QMT15655.

MATERIAL EXAMINED. Holotype and 7 paratypes: NORTH QUEENSLAND: Mt Misery Summit, via Shiptons Flat, 850m, 1♀, 6.xii.1990, GBM, GIT, DJC, RS, LR; 3km S Mt Spurgeon, 1100m, 1♀, flt. intercept, 21.xii.1988-4.i.1989, GBM, GIT, ANZSES; Westcott Road, Topaz, 680m, 1♀, flt.intercept, 6.xii.1993-25.ii.1994, GBM, DJC, HJ; Mt Fisher (Kjellberg Rd), 1100m, 1♀, pyrethrum on logs, 17.v.1995, GBM; Maalan SF on HWY, 850m, 1♂, 25.xi.1994-10.i.1995, GBM, JH; Maalan Rd, 2km S Palmerston Hwy, 750m, 1♀, pyrethrum on tree bases, 18.v.1995, GBM; Mossman Bluff Track, Site 10, 1300m, holotype ♂ 1♀, flt.intercept, 20.xii.1990-15.i.1991, GBM, GIT, ANZSES, in QM. (paratypes QMT15653-54, QMT15656, QMT22380-83).

DESCRIPTION. Small, very narrow, 5.7-7.0mm long, with sutellum apex 3 toothed and external margins of Cx VI and VII tubercular.

MALE. Head length 1.07-1.20 times width across eyes; vertex densely granular; postocular processes rounded, not reaching outer profile of eyes; supra-ocular carinae low and continuous; antenniferous tubercles small, blunt, not divergent, reaching basal quarter of first antennal segment; clypeus just exceeding apex of first antennal segment in length; genal lobes small flat plates, not exceeding apex of clypeus. Rostrum reaching front border of prosternum; rostral groove broad, with lateral carinae distinct, parallel, not converging or contiguous posteriorly. Antennae 1.25-1.30 times length of head; segment I to III subequal in length, segment IV about 1.5 times length of others.

Pronotum maximum width 1.6-1.8 times length; surface rugose-granular on anterior lobe and granular on remainder; anterior lobe with faint median groove sometimes evident and with two crescentic, smooth calli on each side of middle; collar narrow and separated off by a distinct furrow; sides of pronotum straight and unmargined. Scutellum width 1.1-1.3 times length, flat, uniformly granulate; lateral margins carinate, each carina ending posteriorly in a prominent tooth; midline of scutellum with an incipient longitudinal carina on posterior third which also ends in a tooth; anterior angles of scutellum each with a tooth projecting over rear pronotal margin. Hemelytra reaching to rear of segment VI and coria reaching rear of segment II; membranes dark with basal sixth pale.

Abdomen with lateral margins concave giving insect a 'waisted' appearance; dorsal connexival plates smooth; Cx II and III fused; one or two tooth-like sublateral projections at each interconnexival suture; margins of Cx VI and VII strongly toothed; inner tergal disk not delimited by ridges. Pygophore length equal to width, with a circular impression on its basal half. Paratergites of segment VIII short, cylindrical, obliquely truncate and with spiracle terminal.

Thoracic sterna and abdominal St II finely rugose; abdominal St III-V coarsely rugose-punctate and St VI-VII smooth; St II with a concave impression medially; St III-VI with smooth, elongate, median calli; suture between St VI and

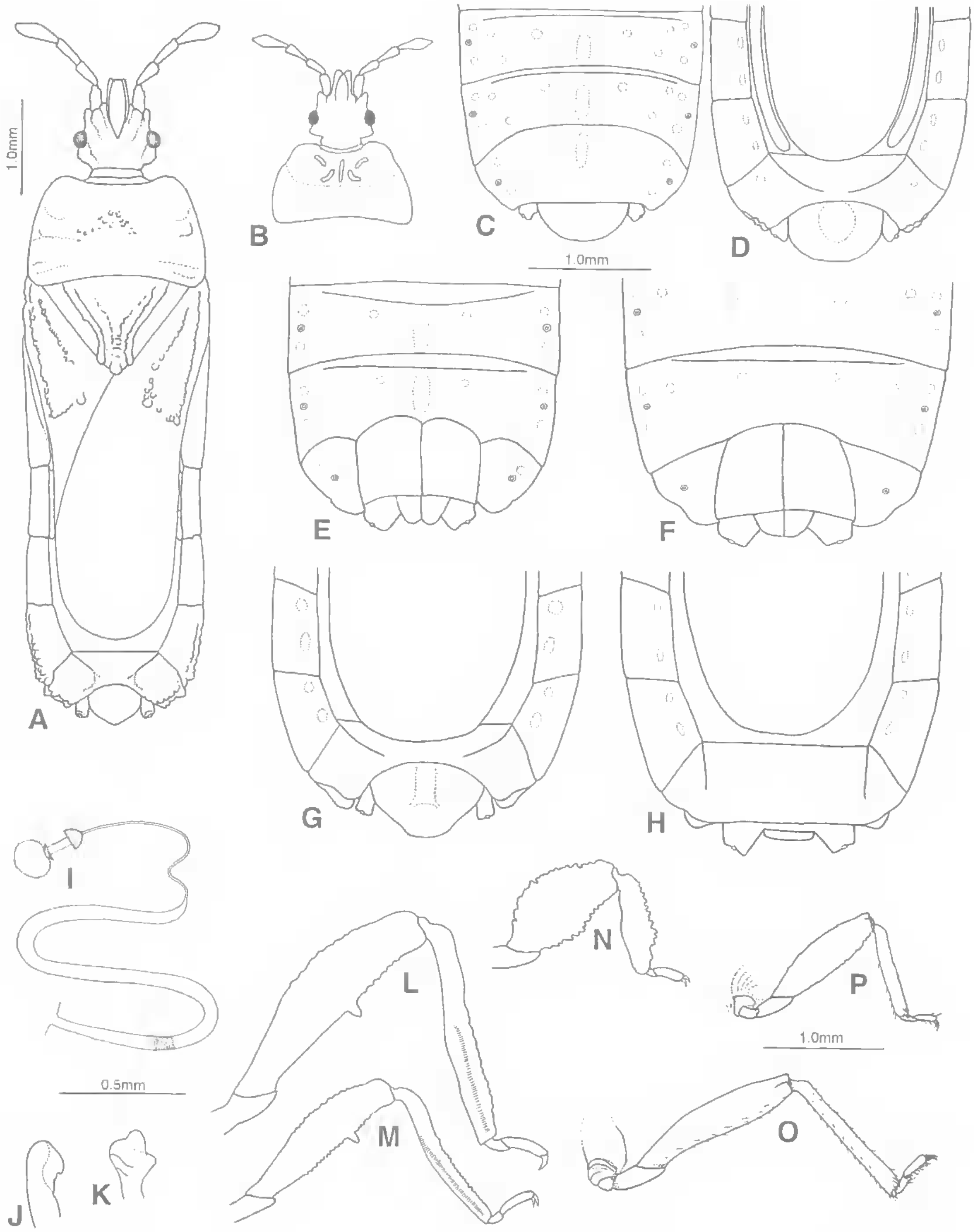

FIG. 16. A-K, *Ctenoneurus* spp.; A, *C. robertsi* ♂ ; B, *C. australis*; C-H, abdominal apices, dorsal (d) and ventral (v); C-E, *C. meridionalis*; C, ♂ v; D, ♂ d; E, ♀ v; F-H, *C. australis*; F, ♀ v; G, ♂ d; H, ♀ d; I, *C. australis*, spermatheca; J, *C. australis*, paramere; K, *C. meridionalis*, paramere; L-M, *Artabanus* hind legs; L, *A. sinuatus*; M, *A. bilobiceps*; N-P, *Neuroctenus*; N, *N. crassicornis* fore leg; O, *N. proximus* hind leg; P, *N. transitus* hind leg.

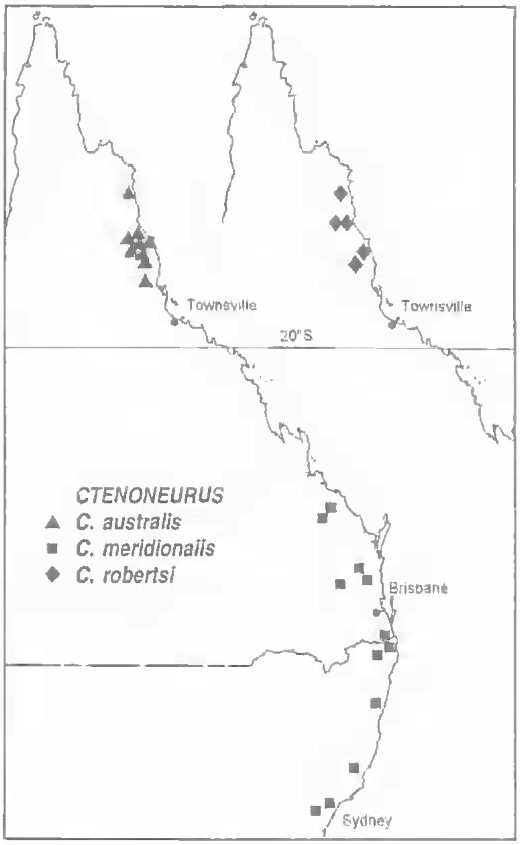

FIG. 17. Records for species of *Ctenoneurus* in eastern Australia.

VII evenly curved; Spiracles of segments II-VII all ventral, equidistant from body margin and mounted on tubercles.

FEMALE. As for ♂ except: Cx IV and V with incipient sublateral carinae present; paratergites of segment VIII broad, truncate with spiracles terminal.

MEASUREMENTS. Holotype ♂ first, then paratype ♂ and range of 2 paratype ♀. L: 5.82, 6.66, 5.76-6.97; W: 1.64, 1.83, 1.57-1.90 ; HL: 1.00, 1.01, 0.95-1.14; HW: 0.86, 0.92, 0.88-0.95; PL: 0.95, 1.00, 0.90-1.14; PW: 1.57, 1.81, 1.52-1.90; AS: I, 0.26, 0.28,0.24-0.33; II, 0.26, 0.28, 0.24-0.31; III, 0.31, 0.28, 0.26-0.35; IV, 0.45, 0.47, 0.45-0.50; SL: 0.88, 0.95, 0.90-1.07; SW: 0.95, 1.09, 0.90-1.21; WL: 3.33,3.94, 3.33-3.94; corium length: 1.24, 1.43, 1.31-1.50.

DISTRIBUTION (Fig. 17). High altitude rainforest from Mt Misery, just north of the Bloomfield River to the southern margin of the Atherton Tableland in N Queensland.

REMARKS. Named for Mr Lewis Roberts, skilled naturalist of Shiptons Flat, who has given great assistance to our field work, as his late father did for earlier biologists working in this remote region. Most specimens have been taken in flight intercept traps.

Aspisocoris Kormilev, 1967

Aspisocoris Kormilev, 1967a:515 (descr.); Kormilev, 1971: 6 (incl. in key); Kormilev & Froeschner, 1987: 110 (catalogue of spp.).

TYPE-SPECIES. *Aspisocoris termitophilus* Kormilev, 1967a, by original designation. Monotypic.

DISTRIBUTION (Fig. 8B). South west Australia.

DESCRIPTION. Termitophilous. Brachypterous. Body form elongate, cylindrical, covered with setigerous granules.

Head longer than wide; postocular tubercles absent; eyes very reduced; antenniferous tubercles short, blunt. Rostrum reaching to fore margin of prosternum; rostral atrium open; rostral groove open posteriorly. Antennae with first segment strongly incrassate; segments III and IV immovably fused and with suture between them becoming obsolete.

Pronotum indistinctly separated into fore and hind lobes; collar not distinct; fore lobe broadly inflated in middle, depressed sublaterally, its anterolateral angles produced forward as triangular lobes which fit closely against post-ocular portion of head. Scutellum very long and narrow, raised into a high ridge for entire length. Hemelytra with corium heavily sclerotised but reaching only to half length of scutellum; membranes abbreviated, reaching a little beyond apex of scutellum.

Abdomen with connexival margins straight; tergal disc flat, covered with short, erect bristles; a longitudinal ridge runs for full length of tergal disc on each side just mesad of suture separating off the connexiva. St III-V with hind margins membranous, overlapping segment posterior to them. All spiracles present and located ventrally.

MALE. Pygophore very large, rounded apically; paratergites of VIII short, flat, adpressed against sides of pygophore; Tg VII bearing a pair of pointed processes which project posteriorly and engage with anterior margin of pygophore.

FEMALE. Paratergites of VIII very short and broad; valves of St VII large, with their mesal margins carinate.

Aspisocoris termitophilus Kormilev, 1967
(Figs 18, 32A-D)

Aspisocoris termitophilus Kormilev, 1967a: 517 (descr.); Kormilev, 1982: 25 (termitophily); Kormilev & Froeschner, 1987: 4, 110 (termitophily; listed).

TYPE. Holotype ♂, Mundaring, WA, J. Clark, whiteants, in SAM I20,332. Examined.

MATERIAL EXAMINED. Holotype and the following 14 specimens: WESTERN AUSTRALIA: Mundaring, ♀ allotype, 1♂ 5♀ paratypes, 7 nymphs, J. Clark, in SAM.

MEASUREMENTS. Holotype ♂ and allotype ♀. L: 4.17, 4.58; W: 1.50, 1.54; HL: 0.90, 0.84; HW: 0.84, 0.84; PL: 0.64, 0.70; PW: 1.24, 1.26; AS: I, 0.30, 0.30, II, 0.20, 0.18, III, 0.28, 0.22, IV, 0.32, 0.26; SL: 1.00, 1.04; SW: 0.80, 0.80; WL: 1.00; corium length: 0.64, 0.80.

DISTRIBUTION (Fig. 14). Known only from the type series collected in a termites' nest a few kilometres east of Perth, Western Australia.

REMARKS. Kormilev (1967a) described this unique genus virtually without comment on its extraordinary modifications for a termitophilous mode of life. Records of Aradidae in galleries of termites are rare and are summarized by Kormilev & Froeschner (1987). Usinger (1936) and Usinger & Matsuda (1959) mentioned *Mezira reducta* Van Duzee, 1927, as occurring in galleries of *Zootermopsis nevadensis* Hagen and *Reticulitermes hesperus* beneath bark of pine logs in California. Although the period of residency with the termites may be long enough for the bugs to become covered with termite excreta the association of *M. reducta* with termites does not seem to be obligatory because the species is also found apart from termites and it shows no modifications for termitophily. Other possible termite associations noted in the literature include those by Kormilev (1976) of *Neuroctenus taiwanicus* Kormilev, 1955 and *Mezira termitophila* Kormilev, 1976a both with singletons from S China labelled 'in the nest of *Nasutitermes*'. Once again the association may not be close because both species are normal members of their respective genera and *N. taiwanicus* is widespread on Taiwan and Hainan in normal situations. The situation is similar for the records of unique specimens of *Pseudomezira termitophilus* (Kormilev) from a nest of termites in Pakistan (Kormilev, 1982) and for *Daulocoris sumatrensis* from termites in Sumatra (Kormilev, 1980).

However, the association of *Aspisocoris termitophilus*, on circumstantial evidence, is assumed to be of a more intimate nature. On the only occasion it has been collected, a long series of both sexes of adults plus immature forms of various ages were taken which indicates that breeding was taking place inside the termite colony. In addition the species shows a number of adaptations which clearly equip it for an inquiline life. Some of these are:

1) *Cylindrical form*. Aradidae are, almost by definition, flattened in form. The cylindrical body form of *Aspisocoris* is therefore quite striking and presumably enables it to traverse the termite galleries more easily. As there is also probably some mimicry involved the cylindrical form thus more closely resembles that of the termite hosts.

2) *Mimetic nymphs*. The nymphs preserved as carded specimens with the adults show a remarkable superficial resemblance to termite workers. They are short, stout, eyeless, depigmented and have head withdrawn into fore margin of prothorax.

3) *Eye reduction*. This accords with permanent life in a termite colony and is a common feature of inquiline insects.

4) *Fusion of antennal segments*. The fusion of the last two antennal segments is unique in the Aradidae and resembles the condition seen in many other inquilines, e.g. the beetle genus, *Tiracerus*.

5) *Prolongation of prothorax lobes*. The protection of the neck region of the head by development of close-fitting prothorax lobes may be a protection from attack. Such protections of vulnerable body regions are seen in other inquilines.

6) *Wing reduction*. The loss of powers of flight is a common symptom of inquiliny.

7) *Reduction of scent gland*. The loss of this defensive mechanism may be associated with the protected environment of a termite colony.

One can only speculate at the precise type of relationship which *Aspisocoris* enjoys with the termites. The type series is mounted with a number of the original termites, including one nasute soldier. This was kindly identified for me by Dr J.A.L. Watson as *Occasitermes occasus* (Silvestri), the only species of an endemic Australian genus which occurs in South Australia and Western Australia. Gay (1974) stated that it is a

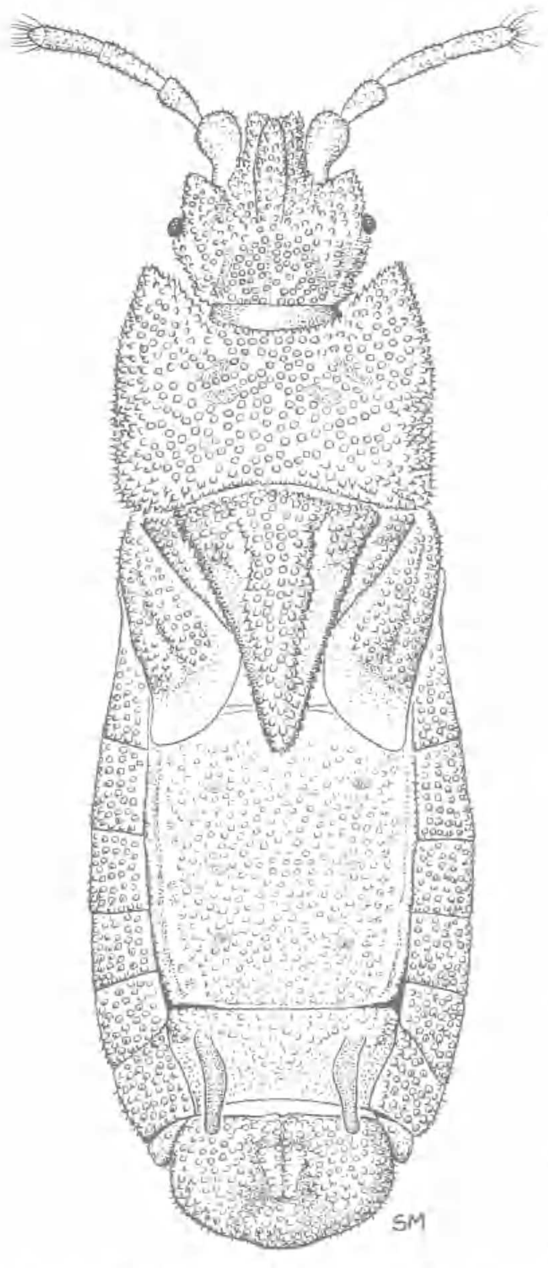

FIG. 18. Dorsal view of ♂ holotype *Aspisocoris termitophilus*.

subterranean species which feeds on rotten or weathered wood. Usinger (1936), with respect to *Mezira reducta*, noted that both the termite species with which it associates are ones which habitually have fungi in their colonies in old wood (Hendee, 1933) and suggests that this fungus may provide the food of the aradid. Since the host termite of *Aspisocoris termitophilus* is associated also with decayed wood a similar relationship may pertain.

The systematic position of *Aspisocoris* in the Mezirinae is difficult to determine, and especially so because of the remarkable morphological modifications for termitophily. Its isolated distribution in SW Australia, far from all other Mezirinae except *Neuroctenus*, and its association with an endemic termite genus similarly confined to the SW, both indicate an early origin. There are certain similarities with *Ctenoneurus*, including the long rostrum, the subcylindrical form and the sublateral ridges on the tergal plate. Although *Ctenoneurus* does not occur today in Western Australia it has an archaic distribution pattern including Africa, Madagascar and the Indo-Pacific which suggests that it may have had a representative in Western Australia at a more favourable climatic period in the past. Such an ancestral *Ctenoneurus* may have been the progenitor of *Aspisocoris*.

Artabanus Stål, 1865

Artabanus Stål, 1865: 31 (descr.); Stål, 1873: 139, 141 (incl. in key): Matsuda & Usinger, 1957: 145 (descr.); Usinger & Matsuda, 1959: 197, 261 (incl. in key; redescription); Kormilev, 1971: 7, 13 (incl. in key; key to spp.); Kormilev & Froeschner, 1987: 106 (catalogue of spp.).

TYPE SPECIES. *Artabanus geniculatus* Stål, 1870 (Philippines), by monotypy.

DISTRIBUTION (Fig. 8C). From South China and Burma across the Indo-Pacific archipelago as far as the Philippines, Fiji, Micronesia, New Caledonia, and northern Australia.

REMARKS. *Artabanus* is characterized by a stridulatory mechanism unique in the Aradidae first noted by Bergroth (1892b) and described by Usinger (1954). The structures are extremely uniform throughout the many species and consist of a curved row of file-like teeth (stridulitrum) on the distal portion of the posterior surface of the hind tibiae (Figs 6A-B, 16L-M) which rub against knife-like, longitudinal carinae (plectrum) on each side of the 4th abdominal sternite (Fig. 20D). There is no record of audible sound being produced. I have handled a number of species in the field but have never noted any leg movement of the type to be expected during stridulation. Scanning electron micrographs of the structures show them to be stridulatory.

Artabanus has been a successful group in colonizing the island groups within its range and of the 43 species about 25 occur east of Wallace's line. Many of these eastern species are local endemics confined to individual islands, and on some islands there has been a moderate proliferation of species, e.g., New Guinea (9 spp), Solomons (8 spp), Fiji (2 spp). There is a tendency to wing loss with 7 species exhibiting brachyptery or microptery; 4 of these occur in New Guinea where *Artabanus* is contributing markedly to the rapid evolution of a flightless aradid fauna (Monteith, 1982).

Two macropterous species are particularly widespread in the Indo-Pacific and have special dispersal abilities. These are the only 2 species that have reached Australia, both are confined to north Queensland.

KEY TO THE AUSTRALIAN SPECIES OF *ARTABANUS*

1. Prothorax with prominently projecting, laminate, anterolateral angles; dorsum with much curled vestiture; size larger, more than 9.00mm . . . . *sinuatus* Stål
   Prothorax without laminate anterolateral angles; dorsum largely glabrous; size smaller, less than 8.00mm . . . . *bilobiceps* Lethierry

Artabanus sinuatus Stål, 1873
(Figs 16L, 20A-B)

Artabanus sinuatus Stål, 1873: 141 (descr.); Lethierry & Severin, 1896: 39 (listed); Usinger & Matsuda, 1959: 262 (listed); Kormilev, 1967c: 296 (locality record); Kormilev, 1971: 14 (incl. in key; locality records); Kormilev & Froeschner, 1987: 109. (listed; discussion of synonymy).
Crimia doreica Walker, 1873: 17 (descr.); Lethierry & Severin, 1896: 47 (listed).
Cinyphus furcatus Signoret, 1880: 541 (descr.).
Artabanus doreica: Distant, 1902: 359 (generic transfer); Usinger & Matsuda, 1959: 262 (listed); Kormilev, 1967a: 530 (locality records).

TYPES. *Artabanus sinuatus*: Holotype ♂, New Guinea, in NRS. Not examined.

Crimia doreica. Type series from New Guinea, Aru, Ceram, Wagiou, in BMNH. Not examined.

MATERIAL EXAMINED. 24 specimens: NORTH QUEENSLAND: Iron Range, Cape York Pen., 1♂ 2♀, 30.vi-4.vii.1977, GBM; East Claudie R., Iron Range, 1♂ 1♀, 6.xii.1985, GBM & DJC; West Claudie R., Iron Range, 4♂ 5♀, 3-10.xii.1985, GBM & DJC, in QM; 11 km ENE Mt Tozer, Iron Range, 1♂ 2♀, 16.vii.1986, TAW, in ANIC. NEW GUINEA: Karimui, 1080 m, 1♀ 11-12.vii.1963, J. Sedlacek; Kiunga, Fly R., 1♂, 15-21.vii.1957, W.W. Brandt; Popondetta, 2♂ 2♀, 27.ii.1966, GBM: Brown River, 1♀, 2.iii.1966, GBM, in QM. (QM duplicates lodged in BMNH, UQIC).

DESCRIPTION. Large, macropterous, pilose, 10-11 mm long, with bilobed, laminate, anterolateral angles of the pronotum. Colour brown with pale connexiva V and VI and abdominal venter.

MALE. Head length 1.1-1.2 times width, its dorsum pilose on vertex, clypeus and antenniferous tubercles; postocular processes absent; antenniferous tubercles long, apically subacute, reaching to half length of first antennal segment; clypeus narrow, bearing cylindrical genal processes almost reaching apex of first antennal segment. Rostral groove open posteriorly. Antennae 1.35-1.40 times head length; segment III longest.

Pronotum width 2.1-2.3 times median length; anterior lobe almost as wide as posterior lobe, with anterolateral angles laminately produced into bilobate extensions; a small tooth present on each side lateral of the indistinctly defined collar; disc of anterior lobe with a pair of setose submedian elevations and a pair of weak sublateral ridges. Scutellum with a pair of blunt median lobes and a pair of smaller lateral lobes projecting forwards over hind pronotal margin; surface transversely wrinkled with a median setose ridge. Hemelytra fully developed, reaching to anterior edge of tergum VII; veins of corium setose.

Abdomen widest across segments II and III, then narrowing at segment V before flaring across segment VI which has protruding connexiva; margin of Cx VII with posteriorly-directed angulations; Tg VII inflated above pygophore. Pygophore short, wide, large, with a dorsal tubercle.

Paratergites of VIII short, truncate, with apical spiracles. Spiracles of II-VI ventral, far from margin, those of VII lateral, visible from above. Femoral spines present only on hind legs.

FEMALE. As for ♂ except: abdomen not narrowed at segment V; margins of Cx VI not noticeably protruding.

MEASUREMENTS. One ♂ and range of 2♀ from Australia. L: 10.83, 10.50-10.67; W: 4.75, 4.75-5.00; HL: 2.30, 2.25-2.32; HW: 1.92, 2.00; PL: 1.80, 1.60-1.72; PW: 3.75, 3.75-3.92; AS: I, 0.84, 0.88-0.98; II, 0.66, 0.60-0.64; III, 1.04, 1.00; IV, 0.58, 0.60-0.62; SL: 1.84, 1.72-1.76;

SW: 2.08, 2.20-2.33; WL: 6.00, 6.00; corium length: 3.00, 3.16-3.30.

DISTRIBUTION (Fig. 21). In Australia this species is known only from rainforest at Iron Range in Cape York Peninsula where it occurs under bark of large logs. Elsewhere it is widespread from the Moluccas through New Guinea to the Bismarcks, the Solomons and Vanuatu.

REMARKS. Kormilev (1967c) noted the synonymy of *Artabanus sinuatus* Stål and *Crimia doreica* Walker but since both names were published in 1873 he was not able to establish which has priority. He has used both names on different occasions (Kormilev 1967a, 1971). Sherborn (1934) gives the date of issue of Walker's volume as May 10, 1873. Regarding Stål's paper, Dr Per Inge Persson, of the Naturhistoriska Riksmuseet, Stockholm informed me in 1978 that, according to their records, Stål's manuscript was submitted to the Royal Swedish Academy of Sciences on January 10, 1872 and was accepted for publication on February 14 of the same year. Later it is recorded that on March 31, 1873 'the printing of the Proceedings of 1872 has not inconsiderably advanced'. However the actual date of issue is still unobtainable and therefore I use Stål's name, *sinuatus*, which has been most frequently used in the past and which was originally proposed in the correct genus. Kormilev & Froeschner (1987) came to the same conclusion.

This large species is rather common in New Guinea but has been taken only occasionally in Australia despite many weeks of specialist collecting at Iron Range.

Artabanus bilobiceps (Lethierry, 1888)

Brachyrhynchus bilobiceps Lethierry, 1888: 464 (descr.).

Artabanus atkinsoni Bergroth, 1889: 734 (descr.).

Artabanus bilobiceps: Bergroth, 1892a: 715; Lethierry & Severin, 1896: 39 (listed); Usinger & Matsuda, 1959: 262 (listed); Blote, 1965: 16 (locality records); Kormilev, 1965b: 2 (locality record); Kormilev, 1967a: 522 (locality records); Kormilev, 1967c: 296 (locality records); Kormilev, 1971: 14,22 (incl. in key; locality records); Kormilev & Froeschner, 1987: 106 (listed).

Artabanus australis Kormilev, 1958a: 91; Kormilev, 1971: 14 (incl. in key); Kormilev & Froeschner, 1987: 106 (listed). *syn. nov.*.

TYPES. *Brachyrhynchus bilobiceps* Lethierry (Burma). Not located.

Artabanus australis Kormilev, Holotype ♀, Queensland, in HNHM. Type not examined but specimens compared with it on my behalf by Dr Tamás Vásárhelyi.

REMARKS. *Artabanus bilobiceps* is the most widespread member of its genus and occurs from Burma across the Indonesian islands to the Philippines, New Guinea, the Bismarcks and north Queensland. It penetrates into the more remote islands of Micronesia in the form of *A. lativentris* Esaki & Matsuda, 1951, which seems to be only a poorly differentiated version of *bilobiceps*. The synonymy of *A. australis* Kormilev recorded here is straightforward. There is only one *bilobiceps*-like taxon in north Queensland and Kormilev sighted 2♀ specimens of it. The first he made the unique holotype of *A. australis* in 1958; the second he determined 7 years later as *A. bilobiceps* (Kormilev, 1965b). I have examined the latter specimen and Dr Vásárhelyi has examined the former on my behalf. The 2 are conspecific and agree well with typical *A. bilobiceps* from Borneo and New Guinea. In his later key to *Artabanus* species Kormilev (1971) omited reference to his prior Australian record of *A. bilobiceps* and separated *A. australis* from it by lack of the femoral spine on the hind leg. The spine is normally present in Australian material but is occasionally reduced and inconspicuous.

Kormilev (1967a) separated *A. bilobiceps* into 2 sub-species.

Artabanus bilobiceps papuasicus Kormilev, 1967
(Figs 4E, 5I, 6A-B, 7C, 16M, 20C-F)

Artabanus bilobiceps papuasicus Kormilev, 1967a: 522 (descr.); Kormilev, 1971: 14,22 (incl. in key; locality records); Kormilev & Froeschner, 1987: 107 (listed).

TYPE. Holotype ♂, Mt Lamington, 1,300-1,500', NE Papua, C.T. McNamara, in SAM I 20,357. Examined.

MATERIAL EXAMINED. Holotype and 42 specimens: NEW GUINEA: Popondetta, 1♀, 27-28.ii.1966, GBM; Wau, 1♂, 3-4.ii.1966, GBM; Lae, 1♀, 28.iii.1971, R. Parrott, in QM. BISMARCK ARCHIPELAGO: Kerevat, New Britain, 2♀, 10.ii.1966, GBM, in QM. NORTH QUEENSLAND: West Claudie R., Iron Range, 7♂ 2♀, 3-10.xii.1985, GBM & DJC, in QM; Shiptons Flat, via Helenvale, 1♀, 16-18.v.1981, I.D.Naumann, in ANIC; Cooktown, 1♀, in NRS; Cooper Ck., 12 ml N of Daintree R., 1♀, 26.iii.1976, I.D. Galloway, in QDPI; 9 ml N of Daintree R. Ferry, 1♀, 2.ix.1969, J.G. & J.A. Brooks, in ANIC; Upper Daintree R., 1♀, 27.xii.1964, GBM; Mossman Gorge, 1♂, 25-26.xii.1964, GBM; Upper Mulgrave

River, 1♂ 1♀, 15.viii.1966, GBM, 10♂ 8♀, 26-27.xii.1967, GBM: Flying Fish Point, 2♀, 21.i.1965, E.C. Dahms, in QM. (QM duplicates lodged in BMNH, MDPI, UQIC, DJ, SAM, EH).

DESCRIPTION. Medium-sized macropterous, glabrous, bicoloured, 6.3-7.2mm long, without lamellate anterolateral angles of pronotum and with pronounced sexual dimorphism in body shape. Colour black with connexiva checkered in black and white as follows: Cx II and IV wholly black, Cx III, V, VI and VII with anterior half white and posterior half black.

MALE. Body elongate, subrectangular, widest across hind lobe of pronotum; abdomen with sides straight, narrowing slightly towards posterior. Head usually slightly longer than wide; posteroventral angles each with a polished posterior projection; antenniferous tubercles short, blunt; genal processes widely separated, subcylindrical, reaching apical 2/3 of first antennal segment. Rostral groove open posteriorly. Antennae 1.73-1.83 times head length; segment II longest, more than twice length of II.

Pronotum with maximum width about 1.9 times median length; anterior lobe narrowed, about 3/4 width of hind lobes, its lateral margins forming 2 blunt teeth on each side; disc of anterior lobe with 2 conical submedian tubercles. Scutellum width 1.3-1.4 times length, its surface granulate and with an ill-defined median ridge; anterior margin with a pair of acute median teeth and a pair of blunt lateral teeth overlapping pronotum. Hemelytra with apices reaching to basal 1/3 of Tg VI. Hind femora each with a small ventral spine.

Abdomen with dorsal connexival plates smooth; margins of Cx II-VI straight, those of VII each produced into a prominent, acute, backwardly-directed spine; Tg VII strongly convex above pygophore and bearing an acute, posterolaterally directed spine on each side near hind margin. Paratergites of VIII short, blunt, with spiracles apical. Spiracles of segment II-IV ventral, far from margin; those of V and VI ventral, close to margin; those of VII situated on the margin and visible from above. St V, VI and VII with polished, median ornamentation; suture between VI and VII arched forward so that median length of St VII exceeds that of V and VI combined. Parameres as in Fig. 20F.

FEMALE. As for ♂ except; abdomen broad, with sides convex, widest across segment IV; dorsal connexival plates rough, those of segments III-VI with weak submarginal ridges; Tg VII without spines; margins of Cx VII without acute spines; sterna without polished ornamentation. Spermatheca as in Fig. 20E.

MEASUREMENTS. Ranges of 2♂ then 2♀. L: 6.33-6.67, 6.50-7.17; W: 2.28-2.46, 3.08-3.58; HL: 1.20-1.26, 1.26-1.36; HW: 1.16-1.22, 1.26-1.34; PL: 1.20-1.30, 1.26-1.40; PW: 2.28-2.46, 2.48-2.68; AS: I, 0.52-0.54, 0.52-0.60; II, 0.36, 0.36-0.40; III, 0.80-0.88, 0.80-0.88; IV, 0.50-0.52, 0.48-0.50; SL: 0.96-1.00, 1.06-1.14; SW: 1.34-1.36, 1.40-1.50; WL: 3.58-3.75, 3.92-4.25.

DISTRIBUTION (Fig. 21). In Australia this subspecies is confined to low altitude rainforests from near Innisfail north to Cooktown and at Iron Range. Also known from New Guinea, New Britain, New Ireland and Palau Island (Micronesia) (Kormilev, 1971). *A. bilobiceps bilobiceps*, ranges from SE Asia through the western islands of Indonesia to the Philippines (Kormilev, 1967a, 1967c, 1971; Blöte, 1965).

REMARKS. Kormilev (1967a) separated this subspecies from the nominotypical form on the basis of reduced lateral spines of the fore lobe of the prothorax; in his key to *Artabanus* species of 1971 he utilised the lack of shining tubercles on head venter and metasterna in *A. b. papuasicus* to distinguish the 2 taxa. Australian material agrees with New Guinea material in both these features. The two subspecies also differ in the ornamentation of sterna V, VI and VII in the ♂; in Sarawak specimens the smooth areas coalesce into a single circular disc whereas in *A. b. papuasicus* the segmental portions are more discrete.

Caecicoris Kormilev, 1957

Caecicoris Kormilev, 1957a: 398 (descr.; fig.); Usinger & Matsuda, 1959: 193 (listed only); Monteith, 1969: 87 (dimorphism); Kormilev, 1971: 2, 9, 12 (incl. in key); Kormilev & Froeschner, 1987: 120 (catalogued).

Artabanellus Matsuda & Usinger, 1957: 141 (descr., fig.); Usinger & Matsuda, 1959: 222 (descr.; incl. in key); Kormilev, 1971: 26 (incl. in key); Kormilev & Froeschner, 1987: 106 (catalogue of spp.). *syn.nov.*

Zeugocoris Usinger & Matsuda, 1959: 200, 310 (incl. in key; descr.); Monteith, 1969: 87 (synonymy; dimorphism).

Parartabanus Kormilev, 1972: 573 (descr.); Kormilev, 1974: 60 (synonymy).

TYPE SPECIES. *Caecicoris oviventris* Kormilev, 1957, by original designation (= *Crimia microcera* Walker, 1873).

DISTRIBUTION (Fig. 9E). New Guinea, Bismarck Archipelago, Palau, Cape York Peninsula.

REMARKS. This small genus of 3 species was informally recorded from Australia by Monteith 1982. The synonymy of *Zeugocoris* Usinger & Matsuda with *Caecicoris* was established by Monteith (1969) on discovering that the respective type species of the two genera were, in fact, macropterous and micropterous forms of the same species. This was the first documentation of true alary dimorphism in the Mezirinae, a phenomenon now also known in *Usingerida* (q.v.) and *Mastigocoris* (Heiss & Hoberlandt, 1985), and which is believed to be even more widespread in the Indo-Pacific region.

The type species of *Artabanellus* (*A. infuscatus*) is a junior synonym of the type species of *Caecicoris* (*C. microcerus* – see below) and hence *Artabanellus* is a synonym of *Caecicoris*. The only other valid species of the former genus *Artabanellus* is *Caecicoris mcnamarai* (Kormilev, 1967) *comb.nov.* It is an obligately wingless species widespread on the New Guinea mainland and has been figured by Monteith (1982) who commented on its apparent close affiliation with *Caecicoris*. It is much more specialized for apterous life than other species of *Caecicoris*. Should further study determine that it warrants separate generic rank then the name *Parartabanus*, under which Kormilev (1972) mistakenly redescribed it would be available. The third known member of *Caecicoris* is *C. latus* Monteith, 1969, from New Britain and is represented to date by macropters alone. This latter species was overlooked by Kormilev (1971) and is omitted from the world catalogue of Kormilev & Froeschner (1987).

Caecicoris is related to *Mastigocoris* Matsuda & Usinger (widespread in the Indo-Pacific) and *Phanocoris* Usinger & Matsuda (endemic to Fiji), sharing with them its open rostral atrium and form of scutellum. The group has been very successful in colonizing the island masses of the region and this has been achieved by the dispersal ability of winged morphs currently present or in their recent evolutionary past.

Caecicoris microcerus (Walker, 1873)
(Figs 4J, 20G-H)

Crimia microcera Walker, 1873: 21 (descr.); Lethierry & Severin, 1896: 47 (incerti generis).
Pictinus microcerus: Distant, 1902: 360 (listed).
Artabanus inermis Kormilev, 1955b: 201 (descr.); Kormilev, 1971:12 (synonymy).
Caecicoris oviventris Kormilev, 1957a: 399 (descr.); Usinger & Matsuda, 1959: 193 (listed); Monteith, 1969: 87 (synonymy).
Artabanellus infuscatus Matsuda & Usinger, 1957: 141 (descr., fig.); Usinger & Matsuda, 1959: 222 (listed); Kormilev & Froeschner, 1987: 106 (listed) *syn. nov.*
Zeugocoris microcerus: Usinger & Matsuda, 1959: 312 (figured);
Caecicoris microcerus. Monteith, 1969:8 7 (locality records); Kormilev, 1971: 12; Monteith, 1982: 655 (fig.); Kormilev & Froeschner, 1987: 120 (listed); Heiss, 1988: 73 (fig.).

TYPES. Holotype of *Crimia microcera*: Dorey, N coast of New Guinea, A.R. Wallace, in BMNH. Not examined; figured Usinger & Matsuda (1959). Holotype ♀ of *Artabanellus infuscatus*: Peleliu I, Palau Islands, E coast, 29 Jan 1948, Pacific Sci Board, Ent.Surv. of Micronesia, H.S.Dybas, leg., in NMNH, Washington. Examined.

AUSTRALIAN MATERIAL EXAMINED. 8 specimens: NORTH QUEENSLAND: West Claudie River, Iron Range, rainforest, 1 micropt. ♀, 29-30.ix.1974, GBM, 3 macropt. ♂, 2 micropt. ♂, 2 micropt. ♀, 3-10.xii.1985, GBM & DJC, in QM.

DISTRIBUTION (Fig. 21). Widespread on the mainland of New Guinea, being recorded from both Irian Jaya and PNG. All records to date are from north of the central mountain cordillera. It has also been recorded from the Bismarck Archipelago (Deslacs Is), as *Artabanus inermis*, and from the Palau islands, as *Artabanellus infuscatus*. The specimens noted here from Iron Range establish the species on Cape York Peninsula in Australia. All have been taken at the West Claudie River where the richest rainforests of the Iron Range region occur.

REMARKS. The unique holotype of *Artabanellus infuscatus* Matsuda & Usinger proved it to be a micropterous ♀ of *C. microcerus*. The specimen is slightly teratological with the right antenna having only 3 segments (shown as 4 in Matsuda & Usinger's illustration) and with the left side of the pronotum lacking much of its angulate-explanate margin (explaining the curious asymmetry of their illustration). In other respects it falls well within the known range of variability for micropterous ♀.

Usinger & Matsuda (1959) illustrate the macropterous ♀ holotype while Monteith (1969) described the micropterous ♂ and discussed implications of the striking alary dimorphism observed in the species in New Guinea. The micropterous ♂ was illustrated with further discussion by Monteith (1982) and Heiss (1988).

Australian material studied now includes 3 of the 4 morphs, with only macropterous ♀ not present. They agree in all essential features with New Guinea material. One ♀ differs in the surface of the abdominal tergal plate which is relatively flat, finely punctured and lacking the scattered setae of normal micropters. The tergal dorsum is one of the regions which show strong secondary modification associated with loss of wings in New Guinea micropterous morphs, being smooth and glabrous beneath the wings of macropters and coarsely punctate and setose when exposed in micropters. The tergal plate of the Iron Range specimen is intermediate between the normal macropterous and micropterous conditions.

Since the micropterous ♀ morph of *C. microcerus* has not been fully described I give a brief description of the Iron Range specimens below.

DESCRIPTION (Micropterous ♀). Small, 4.67mm long, with broad abdomen (2.52mm) and narrow prothorax (1.46mm). Bicoloured with ground colour reddish brown and legs, antennae, parts of pronotum, and connexiva II and III pale.

Head a little longer (1.10) than wide (0.92); with long curled setae on vertex, clypeus and antenniferous tubercles; postocular processes absent; eyes globular, exserted; antenniferous tubercles slightly divergent, apically sub-acute; genal processes narrow, cylindrical, separate, reaching to two thirds length of first antennal segment. Antennae twice length of head with lengths of segments (I-IV) 0.52, 0.32, 0.74, 0.46. Rostral atrium broadly open anteriorly; rostral groove shallow, closed posteriorly; rostrum not exceeding length of its groove.

Pronotum with maximum width 2.2 times median length, its hind lobe reduced to a narrow strip half the length of anterior lobe; pronotal surface with erect curled setae; anterolateral angles produced into flattened, complex lobes which project anteriorly on each side of neck; lateral margins with a median, laterally directed spine; posterolateral angles angulate; dorsum of anterior lobe with a pair of setose tubercles lateral of midline. Hemelytra reduced to very small circular lobes lateral of base of scutellum; hind wings absent; scutellum large, distinct, triangular, with midline forming a convex, setose elevation.

Abdomen flat, with lateral margins convex; long setae present along posterior edge of each dorsal connexival plate; posterolateral angle of Cx VI slightly produced; margin of Cx VII with an angulate projection bearing the laterally placed spiracle; paratergites of VIII long with lateral spiracles.

Spermatheca of New Guinea specimen (Fig. 20I); with duct short, sclerotised, with a sclerotised lateral diverticulum at half its length.

Scironocoris Kormilev, 1957

Scironocoris Kormilev, 1957a: 401 (descr.); Usinger & Matsuda 1959: 193 (listed only); Kormilev, 1971: 7, 8, 26 (incl. in key; key to spp.); Kormilev & Froeschner, 1987: 191 (catalogue of spp.).

Dimorphacantha Usinger & Matsuda, 1959: 255 (descr.); Kormilev, 1971: 7, 8, 26 (incl. in key); Kormilev & Froeschner, 1987: 135 (catalogue of spp.) *syn. nov.*

TYPE SPECIES. *Scironocoris armigerus* Kormilev, 1957, by original designation.

DISTRIBUTION (Fig 10A). From northern India through the Indonesian Archipelago and the Philippines to New Guinea and to Cape York Peninsula.

REMARKS. The synonymy of *Dimorphacantha* with *Scironocoris* recorded here is one of several synonymies which have arisen because some authors described new genera while Usinger & Matsuda's (1959) world revision was in preparation. Where Usinger & Matsuda could not get access to specimens of these genera for comparison it sometimes happened that they inadvertently redescribed them, as in this instance. This particular synonymy has remained undetected because some errors have crept into subsequent literature on the two nominal genera and because there has been some failure to appreciate the implications of alary dimorphism in the Mezirinae as noted by Monteith (1969, 1982).

In his key to Oriental-Pacific genera Kormilev (1971) distinguished *Dimorphacantha* and *Scironocoris* on the basis of (i) laterally directed pronotal processes, and (ii) strong ♂ metapleural spines in the former but not the latter. Although both these features occur in *D. distincta*, the type species of *Dimorphacantha*, they are not present in all species (Usinger & Matsuda, 1959: 256).

The loss of lateral processes on the pronotum is concurrent with the great reduction of pronotal size associated with brachyptery in the Mezirinae. Kormilev (1971: 26) in noting that no brachypterous species were described in *Dimorphacantha*, was obviously unaware of brachypterous *D. usingeri*, which is illustrated as lacking pronotal processes (Blöte, 1965). Liu

(1980) described brachypterous *D. brachyptera*, from S China without pronotal processes. Another undescribed brachypterous species before me from Sarawak (Kapit) also lacks these processes.

Regarding the metapleural spines of the ♂, Kormilev's key assumed that *Scironocoris* ♂ did not possess such spines. But since all 3 species then known had been described by Kormilev from unique ♀ this could only have been an assumption. Since the ♂ of brachypterous *Scironocoris* (*sensu* Kormilev) recorded below from Australia do have short metapleural spines homologous with those of *Dimorphacantha distincta* it is obvious that this was a false assumption and there are no longer valid grounds for recognising 2 separate genera. Attention is drawn also to *Rustem* Kormilev, 1957b, which was described from a single ♀ from Iran; this genus appears to be another generic synonym of *Scironocoris* but I have not the opportunity to pursue this at present. *Pseudartabanus* Esaki & Matsuda, 1952, with one brachypterous and one macropterous species from Taiwan also appears to belong to this group but authentic material needs to be examined. *P. armatus* from Assam (Heiss, 1982b) is a *Scironocoris* because of its spined femora and details of head and pronotal structure.

Although Usinger & Matsuda's *Dimorphacantha* is a junior synonym their description is more valid for the taxon now to be known as *Scironocoris* than is Kormilev's since it embraces macropterous and brachypterous forms. However a brief diagnosis is given here also:

DIAGNOSIS. Small, 5-8mm long, related to *Artabanus* but lacking the stridulatory structures on the hind legs and on abdominal sternites of that genus, macropterous, brachypterous or micropterous.

Head about as long as wide; postocular processes absent; antenniferous tubercles short, barely reaching 1/3 length of first antennal segment, never apically pointed; clypeus short with genal processes small or absent. Antennae long, more than 1.5 times head length, with segments I and III longer than II and IV. Rostral atrium closed and slit-like; rostrum not reaching beyond hind margin of head; rostral groove open or closed behind.

Pronotum variable depending on wing development, but always with fore lobe divided from hind lobe by a distinct transverse depression; fore lobe with anterolateral angles more or less produced, and its disc with sublateral elevations, which are usually pronounced in brachypterous species, and sometimes also with submedian elevations; midline of fore lobe with a median groove; hind lobe large and overlapping mesothorax in macropters, reduced to a narrow, transverse, non-overlapping band in brachypters; hind lobe of macropters sometimes with laterally directed processes which are variously reduced in brachypters and may become merely slight humeral elevations. Scutellum in macropters with a pair of basal teeth overlapping hind margin of pronotum and with a median longitudinal ridge; in brachypters scutellum has lost basal teeth, median ridge is indistinct and centre is humped. Hemelytra fully developed (*distinctus*, *luchti*, *sexspinosus*, *papuasicus*, *armatus*, *borneensis*, *obscurus*), brachypterous and consisting only of corium (*usingeri*, *baliensis*, *brachypterus*, *australis*, *malayensis*) or micropterous (*armigerus*).

Legs with all femora bearing subapical, ventral spines, sometimes reduced on fore and mid-legs. Metapleuron of ♂ often bearing a long or short conical spine immediately anterior to hind coxa; ♀ usually with a small polished knob in the same position. Spiracles of segments II-VII ventral, those of segment VIII apical.

INCLUDED SPECIES. The following 13 species are here included in *Scironocoris*. The first species was omitted from the world catalogue of Kormilev & Froeschner (1987) and the last species is described herein.

Scironocoris sexspinosus (Bergroth, 1892) *comb. nov.*
Artabanus sexspinosus Bergroth, 1892a: 710.
Dimorphacantha sexspinosa: Usinger & Matsuda, 1959: 256. (Burma).

Scironocoris armigerus Kormilev, 1957.
Scironocoris armigerus Kormilev, 1957a: 402. (New Guinea).

Scironocoris distinctus (Usinger & Matsuda, 1959) *comb. nov.*
Dimorphacantha distincta Usinger & Matsuda, 1959: 256. (Borneo, Sumatra, Philippines, Malay Peninsula).

Scironocoris luchti (Kiritshenko, 1959) *comb. nov.*
Artabanus luchti Kiritshenko, 1959: 187.
Dimorphacantha luchti: Kormilev, 1971: 26. (Java, Sumatra, Sulawesi, Malay Peninsula, China).

Scironocoris usingeri (Blöte, 1965) *comb. nov.*
Dimorphacantha usingeri Blöte 1965: 15. (Java).

Scironocoris obscurus Kormilev, 1971. (New Guinea).

Scironocoris papuasicus Kormilev, 1971. (New Guinea).

Scironocoris baliensis Kormilev, 1972. (Bali).

Scironocoris brachypterus (Liu, 1980) *comb. nov.*

Dimorphacantha brachyptera Liu, 1980: 177, 183. (China).

Scironocoris malayensis Kormilev, 1983. (Malay Peninsula).

Scironocoris borneensis (Kormilev, 1986) *comb. nov.*

Dimorphacantha borneensis Kormilev, 1986: 256. (Borneo).

Scironocoris armatus (Heiss, 1982) *comb. nov.*

Pseudartabanus armatus Heiss, 1982b: 194. (Northern India).

Scironocoris australis sp.nov.
(Figs 5J, 19, 20J-N)

TYPE. Holotype ♂, West Claudie River, Iron Range, N Qld, 29-30.ix.1974, G.B. Monteith, Rainforest. QMT11656.

MATERIAL EXAMINED. Holotype and 20 specimens: NORTH QUEENSLAND: West Claudie River, Iron Range, Cape York Peninsula, 11♂ paratypes, 4♀ paratypes, 29-30.ix.1974, GBM, in QM (QMT26487-26496). (QM duplicates lodged in BMNH, ANIC, EH, UQIC). Non-paratypes. PAPUA NEW GUINEA: Lae Botanic Gardens, 5♀, 6-7.ii.1966, GBM, in QM.

DESCRIPTION. Small, brachypterous, 5.1-6.2mm long, with hemelytral vestiges reaching apex of scutellum and with preapical spines on all femora.

MALE. Body subrectangular. Head length 1.05-1.12 times width across eyes; vertex elevated into 2 longitudinal, setose ridges; antenniferous tubercles slightly divergent; clypeus reaching to half length of first antennal segment; genal processes small, separate, just exceeding clypeal apex. Rostral groove open posteriorly. Antennae 1.6-1.7 times head length; segments I and III longest, subequal, segment IV longer than II.

Pronotum with fore and hind lobes distinct, maximum width 1.9-2.0 times median length; hind lobe width 1.25 times width of fore lobe; fore lobe length 1.25 times length of hind lobe; fore lobe with anterolateral angles subrectangular, slightly protruding; hind lobe with its anterolateral angles also subrectangular; forelobe with a conical elevation sublaterally on each side and with a flat, glabrous callus on each side of median groove. Scutellum triangular with sides somewhat curved; its centre roundly inflated. Hemelytra reduced to fully developed coria as long as scutellum, each bearing an attenuate vestige of membrane on outer apical angle. All femora bearing a prominent, subapical, ventral spine. A short, conical spine present on each metapleuron immediately anterior to hind coxae.

FIG. 19. Dorsal view of ♂ *Scironocoris australis*.

Exposed abdominal tergal plate flat, coarsely punctate, with boundaries between segmental plates obscured; Cx III-VI with faint submarginal ridges; margin of Cx VII angulate, with small, rounded lobes projecting posteriorly; paratergites of VIII short, clavate, with spiracles apical; pygophore simply rounded; parameres as in Fig. 20M.

FEMALE. As for ♂ except: sides of abdomen convex; margin of Cx VII weakly angulate; apex of segment IX exceeding length of paratergites of VIII; metapleural spines absent, their position replaced by a swelling; spermatheca as in Fig. 20N with short, simple duct.

MEASUREMENTS. Holotype ♂ first, then ranges of additional 2♂ and 2♀. L: 5.17, 5.17-5.33, 6.17; W: 2.02, 2.12-2.14, 3.08; HL: 1.14; 1.10-1.14, 1.24-1.26; HW: 1.06, 1.02-1.04, 1.06-

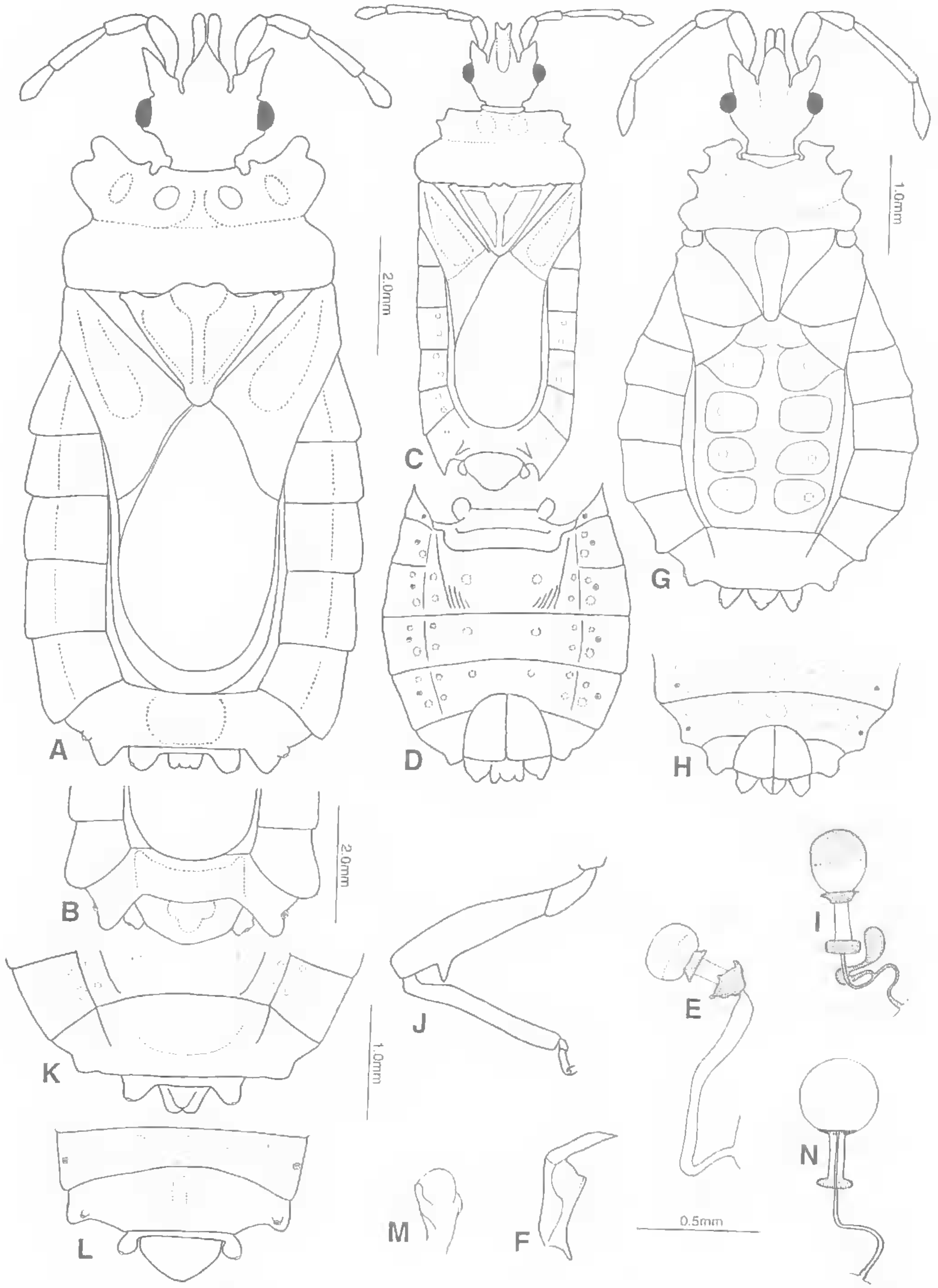

FIG. 20. A-B, *Artabanus sinuatus*; A, ♀; B, ♂ dorsal abdominal apex. C-F, *A. bilobiceps*; C, ♂; D, ♀ ventral abdomen; E, spermatheca; F, paramere. G-I, *Caecicoris microcerus*; G, ♀ micropter; H, ♀ micropter, ventral abdominal apex; I, spermatheca. J-N, *Scironocoris australis*; J, ♂ hind leg; K, ♀ dorsal abdominal apex; L, ♂ ventral abdominal apex; M, paramere; N, spermatheca.

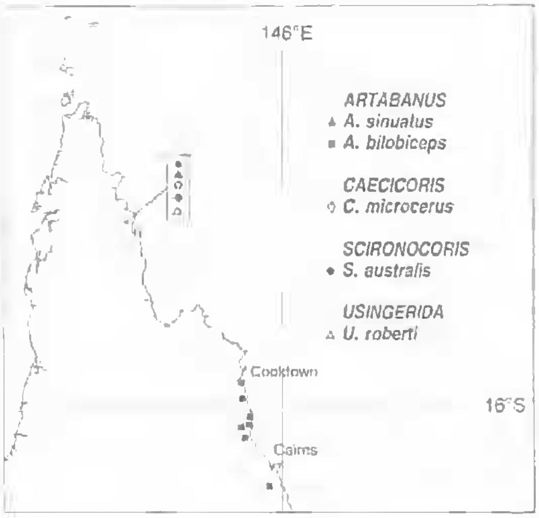

FIG. 21. Records for species of *Artabanus*, *Caecicoris*, *Scironocoris* and *Usingerida* in northern Queensland.

1.20; PL: 0.92, 0.96, 1.10-1.12; PW: 1.84, 1.84-1.86, 2.20; AS: I, 0.56, 0.50-0.54, 0.58-0.62; II, 0.34, 0.32-0.34, 0.40; III, 0.54, 0.54, 0.60-0.62; IV, 0.46, 0.42-0.44, 0.48; SL: 0.68, 0.70, 0.92; SW: 1.14, 1.10-1.16, 1.35-1.40.

DISTRIBUTION (Fig. 21). A single series taken in rainforest at Iron Range, N Queensland. Two specimens from northern New Guinea are tentatively ascribed to this species, but are not made part of the type series.

REMARKS. Although none have been noted yet there is a very strong likelihood that some species of *Scironocoris* will prove to exhibit alary dimorphism. The morphological relationships between macropterous and brachypterous species are virtually identical to those in the proven cases of dimorphism in *Usingerida roberti* and *Caecicoris microcerus* (Monteith, 1969), viz. reduction of pronotal hind lobe, inflation of scutellum, and roughening of the abdominal tergal plate. The implications of this possibility are that some described brachypterous species may be conspecific with some macropterous species. Many of the nominal species have been described from unique specimens so there is also strong likelihood that further synonymy will be revealed when correlated ♂s and ♀ are obtained of more species. For this reason it is with some trepidation that I describe another species based solely on brachypterous forms. However, the long series of 16 lessens the probability that a macropterous form exists, although the presence of the species on Cape York Peninsula suggests that a winged morph may be rather recent in its ancestry.

Scironocoris australis differs from *S. armigerus*, its geographically nearest flightless relative, in the micropterous condition and the lack of fore and mid femoral spines in the latter. Of the 2 New Guinea macropterous species, *S. obscurus* and *S. papuasicus*, the first differs from *australis* in the shape of the pronotal fore lobe. and the second differs in its smaller size and shorter head. *Scironocoris australis* seems to have its closest affinity to *S. baliensis*.

Usingerida Kormilev, 1955

Usingerida Kormilev, 1955a: 142 (descr.); Usinger & Matsuda, 1959:200,308,310 (incl. in key; redescr.; key to spp.); Kormilev, 1971: 9,132 (incl. in key); Kormilev & Froeschner, 1987: 194 (catalogue of spp.).

TYPE SPECIES. *Usingerida walshi* Kormilev, 1955 by original designation.

DISTRIBUTION (Fig. 9F). 18 species which range from Asia across the Indonesian Archipelago to New Guinea and New Britain. Cape York Peninsula, Australia.

REMARKS. *Usingerida* is one of several genera based on species separated off from '*Mezira*' in its old sense as a dumping ground for winged Mezirinae without any distinctive features. To date it has been accepted as a solely macropterous genus distinguished from *Mezira* (*sensu* Usinger & Matsuda, 1959) in the generic keys of Usinger & Matsuda (1959) and Kormilev (1971) by the veinless membranes and prominent anterolateral lobes on the pronotum. However, the observation that some Australian species of '*Mezira*' (e.g. *Brachyrhynchus australis* and *B. wilsoni*) have virtually veinless membranes diminishes the usefulness of the first key character. Inclusion of *Mezira roberti*, without prominent anterolateral pronotal lobes, in *Usingerida* invalidates the second key character. The discovery that *roberti* is a dimorphic species with both macropterous and brachypterous forms also means that *Usingerida* can no longer be regarded as purely macropterous.

The integrity of *Usingerida* as a uniform group of species is not changed by the inclusion of *roberti*. All species share a distinctive scutellum structure, broadly elevated on anterior half and with an indistinct median, longitudinal ridge; all have the hemelytral coria long and apically sinuate; all have extremely slender antennae without the apical crenulation on segments II and III as in Pacific species of '*Mezira*' (=*Brachyrhynchus*); all have the rostrum extending beyond the posterior margin of the rostral groove. Genitalic structures have been studied in *U. roberti* ; the lack of the 'stridulatory' ridge on the inner face of the parameres and the heavily sclerotised and inflated spermathecal duct set it apart from Australian species of *Brachyrhynchus* examined. Parameres of *U. tenericornis* (Heiss, 1989b) are similar.

Usingerida roberti (Kormilev, 1971) *comb. nov.*
(Figs 4H, 5K, 7A, 22A-B, 24P-S)

Mezira roberti Kormilev, 1971: 28 (descr.; fig.); Kormilev & Heiss, 1973: 62 (incl. in key); Kormilev & Froeschner, 1987: 157 (listed).
Usingerida roberti: Monteith, 1982: 654, 655 (fig.).

TYPE. Holotype, Ceram, Piroe, 11.1909, F. Muir. In BPBM 8981. Examined. Specimen somewhat abraded and lacking right foreleg and apical 3 segments of right antenna.

MATERIAL EXAMINED. Holotype and 29 specimens: NORTH QUEENSLAND: Iron Range, Cape York Peninsula, 3 brachypt. ♀, 3 brachypt. ♂, 14 macropt. ♀, 7 nymphs, 1-9.vi.1971, GBM, in QM. (QM duplicates lodged in BMNH, EH, NMNH, UQIC). NEW GUINEA: Popondetta, 1 brachypt. ♂, 27-28.ii.1966, GBM, in QM. INDONESIA: Piroe, Ceram, brachypt. allotype ♀, ii.1909, F. Muir, in BPBM.

ALARY DIMORPHISM. Kormilev described this species from a brachypterous ♂ and ♀ which bore Usinger's determination label as being '*Mezira brachyptera* Usinger', a name that was never published.

The specimens available to Kormilev run easily to *Mezira* in the brachypterous section of Usinger & Matsuda's (1959) key to Old World genera of Mezirinae and so it was natural for Kormilev to place it in that genus.

In June 1971 I collected an aggregation of 20 adult aradids at Iron Range, 6 of them brachypterous (♂ and ♀) and 14 macropterous (♀ only). Neither brachypters nor macropters agreed with any aradid previously recorded from Australia. The brachypterous forms were apparently conspecific with a single ♂ brachypter collected by the writer at Popondetta, PNG, in 1966 and which had been assigned provisionally to *Mezira*, the genus to which it ran in Usinger & Matsuda's key. In attempting to identify the insect, the types of Kormilev's *M. roberti* from the South Moluccan island of Ceram were examined and proved to be identical. This gave the unprecedented situation of having a flightless aradid species known in undifferentiated form from 3 well separated land masses, Ceram, New Guinea and Australia. The status of the macropterous ♀ collected in association with the brachypters at Iron Range was problematical in that they ran to *Usingerida*, not *Mezira*, in keys to macropterous genera (Usinger & Matsuda, 1959; Kormilev, 1971). But close study showed that these macropters, although quite different in general facies, only differed from the brachypterous *M. roberti* with which they were collected by characteristics similar to those shown by Monteith (1969) to separate the winged and micropterous morphs of the dimorphic *Caecicoris microcerus* (q.v.). Similar morphological differences between wing morphs have also been described and figured in *Mastigocoris* (Heiss & Hoberlandt, 1985). The conclusion reached is that the macropters and brachypters collected together at Iron Range are morphs of single species which should be known as *U. roberti* (Kormilev) *comb. nov.*

This new combination brings together patronymics based on both Christian name and surname of the late Robert L. Usinger, father of modern aradid systematics.

This is the third species of Mezirinae in which pronounced alary dimorphism has been demonstrated. As with *Caecicoris microcerus*, the recognition of dimorphism in *U. roberti* unites 2 aradid types which would have been referred to separate genera under the existing taxonomic framework. Undoubtedly more cases of dimorphism will come to light especially on the dispersed land masses of the Indo-Pacific region where the retention of winged morphs gives a great dispersal advantage to those species evolving a wingless lifestyle (Monteith, 1982).

In *U. roberti*, the winged dispersal morph gives a ready explanation for the constancy of form of its brachypters on separate land masses. Whereas *Caecicoris microcerus* is dimorphic in both sexes there is strong circumstantial evidence that *U. roberti* is dimorphic only in the ♀. Of the random sample of 20 specimens taken at Iron Range six are brachypters and of these 3 are ♂ and 3 are ♀; by contrast all 14 macropters are ♀. This apparent retention of a flighted form only in the ♀ has evolutionary significance since dispersal can be achieved by a single mated ♀.

The brachypterous form of *U. roberti* has been adequately described by Kormilev, 1971. I give

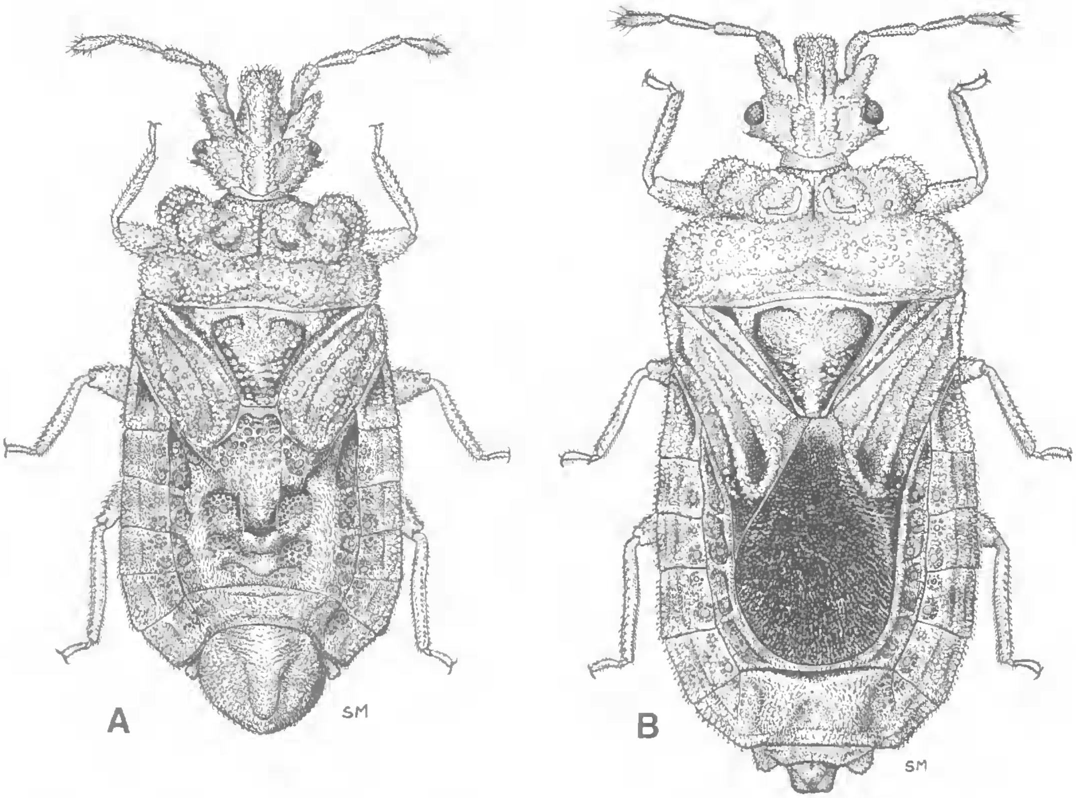

FIG. 22. *Usingerida roberti* from Iron Range. A, brachypterous ♂; B, macropterous ♀.

below a description of the newly discovered macropterous form with notes and comparative measurements for brachypters. Naturally there is a possibility that this macropterous form has been described in the past as a species of '*Mezira*' but I have been unable to confirm this given the confused state of taxonomy of this group in the islands to the north of Australia.

DESCRIPTION (Macropterous ♀). Length 6.00-6.17mm. Head slightly wider than long, its dorsum with numerous short curled hairs; postocular tubercles minute, narrow projections behind eyes; antenniferous tubercles long, divergent, blunt, reaching to 2/3 length of first antennal segment; genal processes short, broad, blunt, subcontiguous, reaching to 4/5 of first antennal segment. Rostrum reaching beyond hind border of rostral groove almost to hind margin of head; rostral groove broad, shallow, open posteriorly. Antennae 1.45-1.50 times head length; all segments slender, subequal in length.

Pronotum with width of hind lobe 2.15-2.25 times median length; fore lobe 0.75 times width of hind lobe; anterolateral angles semicircularly rounded and projecting laterally; lateral margin of pronotum deeply incised between fore and hind lobes; collar narrow, poorly defined; fore lobe with median sulcus and with submedian areas elevated into broad, rounded tubercles; sublateral areas weakly inflated into ridges. Scutellum with width 1.3-1.4 times length, its surface punctate and setose; anterolateral angles thickened and raised; middle of basal margin slightly convex; disc with basal half swollen and apical half with a faint median ridge. Hemelytra reaching hind margin of Tg VI; coria reaching apex of Cx III and apically sinuate; membranes dark, veinless and wrinkled.

Abdomen with margins of Cx II-VI straight; margins of VII straight, converging posteriorly; middle of Tg VII quadrately elevated; paratergites of VIII short, rounded, with spiracles lateral; segment IX long, rounded; tergal disc normal, smooth and glabrous beneath wing membranes. Sterna of thorax broad, with median length of mesosternum 1.3 times length of prosternum; midlines of metasternum and abdominal St II-VI each with a glabrous patch; midline of St VII long, with length slightly longer than V and VI combined. Spiracles of segments II-VI ventral, far removed from margin. Spermatheca as in Fig. 24R with duct inflated into a heavily sclerotised, U-shaped chamber.

Brachypterous ♀: differing from macropters as follows: slightly smaller, length 5.42-6.00; hind lobe of pronotum reduced in length, width and elevation so that width of fore lobe is 0.88 times width of hind lobe; apex of scutellum subtruncate; hemelytral membranes lost; coria fused with terga and shorter, reaching only to half length of Cx II, their apices rounded, not sinuate; tergal disc coarsely punctate, sparsely setose and raised in a sublateral band along each size and in vicinity of scent gland scar.

Brachypterous ♂: as for brachypterous ♀ except: pygophore extremely large, rounded apically, bearing a small, elongate tubercle on dorsal side; paratergites of VIII short, cylindrical, with spiracles apical. Parameres as in Fig. 24S.

MEASUREMENTS. Macropters. Ranges of 3 Australian ♀. L: 6.00-6.17; W: 2.60-2.76; HL: 1.10; HW: 1.14-1.18; AS: I, 0.40-0.42, II, 0.38-0.40, III, 0.40, IV, 0.42-0.44; pronotal fore lobe length: 0.44-0.52; pronotal hind lobe length: 0.60-0.66; pronotal fore lobe width: 1.82-1.86; pronotal hind lobe width: 2.46-2.52; SL: 1.00-1.02; SW: 1.30-1.40; WL: 3.33-3.50; corium length: 1.84-1.90.

Brachypters. Holotype ♂ followed by ranges of 3 additional Australian ♂, then allotype ♀ followed by ranges of 3 additional Australian ♀. L: 4.92, 5.33, 5.42, 5.83-6.00; W: 2.16-2.33, 2.50, 2.72-2.75; HL: 0.98, 1.04-1.08, 1.06, 1.14-1.16; HW: 0.92, 1.00-1.02, 1.06, 1.08-1.12; AS: I, 0.36, 0.40, 0.38, 0.40-0.42, II, 0.30, 0.34-0.36, 0.36, 0.34-0.38, III, 0.32, 0.36, 0.38-0.40, IV, 0.36, 0.40, 0.38-0.42; pronotal fore lobe length; 0.50, 0.50-0.52, 0.54, 0.54-0.58; pronotal hind lobe length: 0.30, 0.36-0.46, 0.42, 0.42-0.46; pronotal fore lobe width: 1.64, 1.68-1.76, 1.76, 1.86-1.94; SL: 0.76, 0.76-0.80, 0.80, 0.86-0.94; SW: 1.10, 1.10-1.30, 1.14, 1.30-1.40; corium length: 1.22, 1.28-1.34, 1.40, 1.44-1.50.

DISTRIBUTION (Fig. 21). South Moluccan island of Ceram, NE New Guinea and Cape York Peninsula where it occurs in lowland rainforests.

REMARKS. *Usingerida roberti* differs from other members of the genus by its small size, rounded anterolateral pronotal angles, non-angulate margin of pronotal hind lobe, and ♀ with straight margins to Cx VII.

There is minor variation in brachypters from the different land masses. The Iron Range series differs from the types in being a little larger with body setae more conspicuous and submedian pronotal elevations a little higher. The Popondetta ♂ differs in its smoother body surface, less prominent anterolateral pronotal angles, median head process longer and dorsal tubercle on pygophore a little larger.

The long series from Iron Range was taken on the outside of the underside of a small log lying on the ground. This is the habitat which Monteith (1969a) suggests predisposes winged aradids to wing loss in the rainforest environment. Despite intensive collecting during many visits to Iron Range the species has not been recollected there. The presence of *Usingerida* in Australia and dimorphism of *U. roberti* were referred to in a summary discussion (Monteith, 1982).

Chinessa Usinger & Matsuda, 1959

Chinessa Usinger & Matsuda, 1959: 200, 269 (incl. in key; descr.); Kormilev, 1971: 7, 10, 117 (incl. in key; key to spp.); Kormilev & Froeschner, 1987: 124 (catalogue of spp.).

TYPE-SPECIES. *Crimia bispiniceps* Walker, 1873, by original designation.

DISTRIBUTION (Fig. 8D). Ceram, New Guinea, Bismarck Archipelago, North Queensland.

REMARKS. *Chinessa* is the most extreme example in the Indo-Pacific region of prolific radiation of a genus of Aradidae on a single land mass. When Usinger & Matsuda (1959) erected the genus they included in it only *bispiniceps*, from New Guinea; Blöte (1965) described *acutissima*, also from New Guinea. Then Kormilev (1971) studied the extensive collections in the Bishop Museum and described 18 species all from the same island with the exception of *lobuliventris*, from New Britain, and a subspecies of a New Guinea species from the Moluccas. Since then 4 more New Guinea species have been erected by Kormilev (1972, 1983, 1984) and Vásárhelyi (1976). *Chinessa* has not been recorded from Australia but 4 species are noted below from north Queensland, *bispiniceps*, *iniqua* which Kormilev described from NG and Ceram, and 2 new species endemic to Australia.

Thus *Chinessa* now has 26 species of which 23 occur on New Guinea; the only other occurrences are on land masses to the immediate east (New Britain), south (Cape York Peninsula) and west (Ceram) of the New Guinea mainland. Of the species on the New Guinea mainland 11 are known only from altitudes above 1,000m. Additionally, the fact that 14 New Guinea species are still known only from unique specimens indicates that many more species may be discovered in future. *Chinessa* evolved on New Guinea and is radiating rapidly there at medium to high altitudes with some dispersal to adjacent landmasses.

An interesting feature is the coexistence of numbers of species at single localities. For instance in New Guinea 7 species are recorded from the vicinity of Enarotadi in Irian Jaya and 4 occur at Wau in the east; this same phenomenon extends to Australian where all 4 recorded species occupy similar habitats at Iron Range. The great number of apparently sympatric species, many of them described from single specimens, might indicate that *Chinessa* species exhibit polymorphism or individual intraspecific variation which authors have falsely interpreted as specific variation. However modern collections from Iron Range have produced long series of all 4 species which occur there. Often more than 1 species occur in mixed aggregations. Each species is uniform morphologically with no indication of intergrades, variability or polymorphism. This indicates that the phenomenon of minor species 'swarms' is real in *Chinessa*.

The typical habitat for *Chinessa* is on the outer bark surface of the underside of fallen logs. This is the habitat typical of wingless species but it is curious that the tendency to wing loss has been suppressed in *Chinessa*. Only a single brachypterous species is known, namely the New Guinea *C. brachyptera* Kormilev.

An intriguing feature of *Chinessa* in Australia is that although colonies are often quite large in number of individuals and they occur in the typical much-searched habitat on log undersides, they are encountered very sporadically. I have collected aradids intensively at Iron Range on 7 visits of 1-3 weeks each, over 20 years. In that period *C. iniqua* and *C. spiniceps* have each been collected only once (14 and 3 specimens, respectively), *C. claudiae* has been collected twice (103 specimens) and *C. pusilla* has been taken 4 times (13 specimens).

Morphologically the genus is notable for its prominent, divergent genal processes, its backwardly-directed, postocular head lobes, its incurved anterolateral projections of the pronotum and the acute extensions of connexiva of abdominal segment VII. All these features occur in the type species but one or more are absent in many of the subsequently described species; however the uniform overall facies indicates that we are dealing with a monophyletic group, albeit one undergoing rapid evolution.

KEY TO THE AUSTRALIAN SPECIES OF *CHINESSA*

1. Pronotum with anterolateral angles produced forward as tapering processes which curve inwards towards the head; spiracles of abdominal segment VII not visible in dorsal view; St VII of ♂ with a small, circular, polished callus on each side of middle at about half its length 2
   Pronotum with anterolateral angles rounded, not produced forward; spiracles of abdominal segment VII situated on lateral edge and visible in dorsal view; St VII of ♂ with a swollen polished area on each side adjacent to anterior margin of segment 3

2(1). Genal processes long, strongly divergent and apically sharply pointed; posterolateral angles of Cx VI strongly projecting and sharply angulate; posterior projections of Cx VII sharply pointed, much longer than paratergites of VIII . . . . *bispiniceps* (Walker)
   Genal processes short, blunt, not strongly divergent; posterolateral angles of Cx VI slightly projecting, rounded; projections of Cx VII blunter as long as, or barely longer than, paratergites of VIII . . . . *claudiae* sp. nov.

3(1). Submedian areas of fore lobe of pronotum raised into conical tubercles; posterolateral angles of Cx VI projecting as blunt lobes; glabrous swellings of St VII of ♂ not differentiated into short, oblique ridges . . . . . *iniqua* Kormilev
   Submedian areas of pronotum weakly convex, not conically raised; posterolateral angles of Cx VI not projecting; glabrous swellings of ♂ St VII forming short oblique ridges abutting the anterior margin . . . . *pusilla* sp.nov.

Chinessa bispiniceps (Walker, 1873)
(Figs 4G, 24C,F,L,O)

Crimia bispiniceps Walker, 1873: 20 (descr.).
Artabanus bispiniceps: Distant, 1902: 359 (generic transfer); Kormilev, 1955b: 201 (descr. of female; figs; misident.).
Chinessa bispiniceps. Usinger & Matsuda, 1959: 270, 271 (generic transfer; fig.) Kormilev, 1971: 118, 122 (incl. in key); Vásárhelyi, 1985: 174 (fig.); Kormilev & Froeschner, 1987: 124 (listed).

LECTOTYPE. Walker (1873) described this species from 5 specimens stated as 'a-d. New Guinea. Presented by W.W. Saunders, Esq. e.

New Guinea. From Mr Wallace's collection'. I have examined all 5 specimens (2 ♂ and 3 ♀) in the British Museum. The Wallace specimen (a ♀) bears a circular green edged label stating 'Type', and is illustrated by Arthur Smith (Usinger & Matsuda, 1959: fig. 78); the caption refers to it as the 'Type Female'. However, as advised by Mr W. Dolling, the green 'Type' labels on Walker's syntypes do not have any status and there has never been any formal selection of a lectotype. Since Walker's original description only referred to the ♂, since this is the type species of *Chinessa*, and since the syntypic series is composite it is appropriate that this opportunity is taken to fix a lectotype. The labels currently on the five specimens are as follows:

Specimen A (female): Type / 17. Crimia bispiniceps / Saunders 65.13 / Dor. / Dorey Wallace / Spec figured/ Acanthogenys bispiniceps (Walk.) det R.L.Usinger '49.

Specimen B (female): S / Saunders 85.13 / Crimia bispiniceps Walkers Catal. (right wing card-mounted beneath).

Specimen C (male): Bac. / Saunders 65.13

Specimen D (male): S / Saunders 65.13 / Crimia bispiniceps Walker's Catal. / Chinessa bispiniceps (Walker) (in Usinger's hand).

Specimen E (male): N / Saunders 65.13 / Crimia bispiniceps Walkers Catal.

Usinger & Matsuda (1959) commented on what they perceived to be 'an astonishing degree of sexual dimorphism' in the type series because the ♂ lacked the projecting pronotal lobes of the ♀. Kormilev (1971) suggested there were 'actually 2 species' because of the pronotal variation mentioned by Usinger & Matsuda. Having examined the type series, and given the species diversity now known in *Chinessa*, I believe that the 5 specimens represent 5 different species. The two ♀ belong in the section of the genus with projecting, inturned pronotal lobes. Specimen A was obviously considered to be the type by Usinger & Matsuda (1959) and is so labelled in their illustration. In Usinger's handwriting it bears an unpublished generic name, which was obviously changed to *Chinessa* before publication. It runs directly to *bispiniceps* in Kormilev's (1971) key and its illustration has been taken as the definitive representation by all authors. Specimen B lacks the prominent angulations of Cx VI seen in A and runs to *forfex/armata* in Kormilev's key. This specimen has its tergal plate exposed and seems to be the origin of Fig. 58A in Usinger & Matsuda (1959). Specimens C, D and E, belong in the section of the genus with unmodified anterior angles of the pronotum and run to *iniqua/modesta* in Kormilev's key. However they differ from each other in shape of CX VI and VII and in submedian tubercles on the pronotum. Specimen D is labelled *C. bispiniceps* by Usinger but cannot be conspecific with the figured ♀ (Specimen A). Since the present study does not deal with the complex New Guinea fauna it is not appropriate to attempt to deal with the identity of all specimens. It should be noted that the specimen in the HNHM used for Kormilev's (1955b) description and figure of the ♀ of *bispiniceps* is also not that species because it lacks projecting, incurved pronotal lobes. I hereby select and label Specimen A as the lectotype thus preserving Usinger's intention and conforming with usage since 1959. The other syntypes are not conspecific.

MATERIAL EXAMINED. Type series and 36 specimens: NORTH QUEENSLAND: West Claudie River, Iron Range, 2♂ 1♀, 29-30.ix.1974, GBM, in QM; Mt Finnigan slopes, 30km S Cooktown, 400m, 1♀, 3.vii.1982, SJP, in ANIC; Upper Mulgrave River, via Gordonvale, 15♂ 10♀, 1-3.xii.1965, GBM, 3♂ 1♀, 15.viii.1966, GBM, 1♀, 26-27.xii.1967, GBM; Palmerston NP, 350-400m, 1♂ 1♀, 2.i.1990, GBM, in QM. (QM duplicates lodged in BMNH, UQIC).

MEASUREMENTS. Lectotype ♀, first, then range of 2♂ and 2♀ from Australia. L: 7.28, 6.66-7.00, 7.66-7.91; W: 3.35, 2.69-2.81, 3.35-3.60; HL: 1.55, 1.45-1.56, 1.50; HW: 1.25, 1.16-1.15, 1.25; PL: 1.16, 1.00-1.09, 1.10; PW: 2.62, 2.34-2.35, 2.56-2.75; AS: I, 0.53, 0.47-0.41, 0.47-0.48; II, 0.47, 0.37-0.41, 0.47-0.46; III, 0.59, 0.53-0.50, 0.59-0.58; IV, 0.56, 0.53-0.50, 0.56-0.52; SL: 1.28, 1.15-1.12, 1.30-1.35; SW: 1.60, 1.41-1.62, 1.56-1.70; WL: 4.00, 3.50, 3.85-4.15; corium length: 1.50, 1.44-1.50, 1.50-1.60.

DISTRIBUTION (Fig. 25). New Guinea and northern Queensland as far S as the Cairns district. In New Guinea, *C. bispiniceps* seems to be principally a lowland species and is widespread. These features of its distribution pattern undoubtedly predisposed it to be the species which has penetrated furthest into Australia. In Australia it occurs both at Iron Range (one collection) and in the Cairns rainforest system. In the latter region it appears very localized and has been taken principally in the lowland rainforests of the Upper Mulgrave River Valley where it is common. The singleton from the lower slopes (400m) of Mt Finnigan is the only record above lowlands.

REMARKS. Australian specimens are uniform from all localities. Females agree with the New Guinea lectotype ♀. Since I have positive correlation of ♂ and ♀ in long series from Australia it is now possible to be sure of the characteristics of the ♂ (Figs 24C,24F). Vásárhelyi (1985) illustrated the apex of the abdomen of an Australian (Mulgrave River) ♂ specimen. Parameres (Fig. 24O) and spermathecae (Fig. 24L) of Australian specimens are illustrated here.

Chinessa claudiae sp. nov.
(Figs 23, 24G-I,K,N)

TYPE. Holotype ♂, Iron Range, Cape York Peninsula, 16-23.xi.1965, G. Monteith, QMT11657.

MATERIAL EXAMINED. Holotype and 102 paratypes: NORTH QUEENSLAND: Iron Range, 15♂ 9♀, 16-23.xi.1965, GBM; West Claudie R., Iron Range, rainforest, 50m, 55♂ 24♀, 3-10.xii.1985, GBM & DJC, in QM. (QM duplicates lodged in BMNH, ANIC, MDPI, UQIC, DJ, SAM, EH, NMNH, HNHM). (paratypes: QMT26386-26468).

DESCRIPTION. Medium-sized, 6.1-7.2mm long, with narrow anterior pronotal processes and blunt genal processes.

MALE. Head length 1.1-1.2 times width; postocular margins of head parallel behind eyes then deeply excised into the neck leaving backwardly directed lobes; antenniferous tubercles divergent, apically acute, reaching to 1/2 length of first antennal segment; genal processes short, blunt, not strongly divergent, reaching a little beyond apex of first antennal segment. Rostrum slightly longer than the broad, shallow rostral groove which is parallel-sided and semi-closed posteriorly. Antennae 1.32-1.43 times head length, segment II shortest, segment III longest.

Pronotum width 2.1-2.3 times median length; anterolateral angles produced forward as narrow lobes which curve mesally at their apices; collar distinct but narrow; fore lobe grooved along midline; submedian areas each with a glabrous callus posterior to a high conical tubercle; sublateral areas each with a small tubercle lower than submedian tubercles; posterior pronotal lobe coarsely granulate and depressed on each side of midline. Scutellum width 1.25-1.40 times length; anterolateral angles each with a tooth projecting over pronotal border; lateral margins bordered except apically; disc rugose-punctate with an irregular median carina. Hemelytra reaching to half length of Tg VII; coria apically straight reaching to half length of Cx III; membranes black with distinct veins.

Abdominal Cx punctate on mesal 2/3 and smooth on outer 1/3; Cx II and III fused; margins of Cx II and III fused; margins of Cx II-V straight; margin of Cx VI slightly protuberant; margin of Cx VII each with an angulate projection reaching to, or a little beyond, apex of paratergites of VIII. Spiracles of segments II-VI ventral, those of VII sublateral and just visible from above. Suture between St VI and VII straight, in middle and angled backwards at sides; St VII with a smooth, oval callus on each side at half its length.

FIG. 23. Dorsal view of ♂ *Chinessa claudiae*.

Parameres as in Fig. 24N.

FEMALE. As for ♂ except: abdomen much broader; St VII without calli; hemelytra reaching almost to hind margin of Tg VI; spermatheca (Fig. 24K) with apical half of duct sclerotised.

MEASUREMENTS. Holotype ♂ first, then ranges of additional 2♂ and 2♀. L: 6.17, 6.33-6.50, 7.17; W: 2.75, 2.92-3.00, 3.58-3.67; HL: 1.32, 1.40, 1.44-1.50; HW: 1.10, 1.16-1.20, 1.30; PL: 1.00, 1.10-1.16, 1.14-1.16; PW: 2.28, 2.34-2.40, 2.60-2.75; AS: I, 0.40, 0.46-0.48, 0.48-0.50;

II, 0.36, 0.40-0.42, 0.44; III, 0.50, 0.54-0.56, 0.60; IV, 0.48, 0.52, 0.52; SL: 0.96, 1.04-1.10, 1.20; WL: 3.33, 3.50, 3.75; corium length: 1.38, 1.40-1.50, 1.60-1.64.

DISTRIBUTION (Fig. 25). Lowland rainforest at Iron Range, northern Cape York Peninsula.

REMARKS. This species is related to *C. bispiniceps* and shares with that species all the typical features of the genus except for the short, blunt genal prongs of *claudiae*. In November 1965 it was taken in mixed colonies with *C. pusilla*. In December 1985 a very large colony was located on the underside of a small log but this time it shared the situation with a small proportion of *C. iniqua*.

The species is named for the Claudie River along which the rich rainforests grow at Iron Range, and which in turn was named for his daughter by noted early Peninsula gold prospector Billy Lakeland about 1890.

Chinessa pusilla sp. nov.
(Figs 24B,D,E,M)

TYPE. Holotype ♂, Iron Range, Cape York Pen., N. Qld., 16-23.xi.1965, G. Monteith, QMT11658.

MATERIAL EXAMINED. Holotype and 12 paratypes: NORTH QUEENSLAND: Iron Range, Cape York Peninsula, 7♂ 1♀, 16-23.xi.1965, GBM, 2♂ 1, 28.iv.-1.v.1968, GBM, 1♀, 1-9.vi.1971, GBM, 1♂, 27-30.iv.1973, GBM, in QM. (QM duplicates lodged in BMNH, ANIC, UQIC) (paratypes, QMT26376-26384).

DESCRIPTION. Small, 5.5-6.2mm long, lacking both anterior projections and submedian elevations on the pronotum.

MALE. Head length 1.7-2.8 times width; postocular margins produced strongly backwards and deeply incised between projection and neck; antenniferous tubercles divergent, rather blunt, reaching basal third of second antennal segment. Rostrum slightly longer than rostral groove. Antennae 1.35-1.45 times head length; segments I and II subequal, shortest; segment III longest.

Pronotum width 2.3-2.4 times median length; anterolateral angles rounded, projecting slightly forward; collar distinct but narrow; submedian area of fore lobe consisting of a slightly raised glabrous callus on each side of median groove; sublateral areas swollen but not forming tubercles; posterior lobe of pronotum granulate, depressed on each side of midline. Scutellum with width 1.3-1.4 times length; basal angles with a small tooth on each side projecting over base of pronotum; lateral margins bordered except at apex; disc rugose-punctate, with median ridge obsolete. Hemelytra reaching to a little beyond hind margin of Tg VI; coria with apices straight, reaching just beyond hind margin of Cx II; membranes dark, veined.

Abdomen with margins of Cx II-V straight; margin of Cx VI slightly protuberant at hind angles; margin of segment VII with apices of angulations blunt and shorter than apex of paratergites of VIII; surface of dorsal Cx plates uniformly punctate; Cx II and III fused. Spiracles of segments II-VI ventral, those of VII sublateral. Suture between St VI and VII curved posteriorly in middle and angled backwards at sides; St VII with a raised, smooth callus defined by a short ridge on each side of middle immediately behind fore margin. Parameres as in Fig. 24M.

FEMALE. As for ♂ except: abdomen much broader; hemelytra reaching to hind margin of Tg VI; St VII without calli.

MEASUREMENTS. Holotype ♂ first, then ranges of additional 2♂ and 2♀. L: 5.50, 5.50-5.67, 6.17; W: 2.36, 2.40-2.42, 2.88-2.90; HL: 1.22, 1.20-1.22, 1.32-1.36; HW: 0.98, 1.00-1.04, 1.06-1.08; PL: 0.84, 0.86-0.88, 0.96-0.98; PW: 1.96, 2.08, 2.24-2.26; AS: I, 0.40, 0.40-0.42, 0.44-0.46; II, 0.38, 0.40, 0.42; III, 0.48, 0.50, 0.52-0.56; IV, 0.42, 0.42-0.44, 0.46-0.48; SL: 0.92, 0.92-0.94, 1.06-1.10; SW: 1.24, 1.30-1.32, 1.40; WL: 2.84, 2.90-2.92, 3.32-3.33; corium length: 1.20, 1.30-1.40, 1.50.

DISTRIBUTION (Fig. 25). Lowland rainforest at Iron Range, northern Cape York Peninsula.

REMARKS. This is one of the smallest species in the genus and is related to the New Guinea species, *C. modesta* Kormilev (1971), which was described from a unique ♀ from Maprik on the northern side of the island. *Chinessa pusilla* differs from *modesta* by its flat pronotal tubercles and its longer genal processes. I have before me a series of an undescribed species, also related to *modesta*, from Kerevat on New Britain so this element of *Chinessa* is one which has crossed sea barriers from New Guinea on at least 2 occasions.

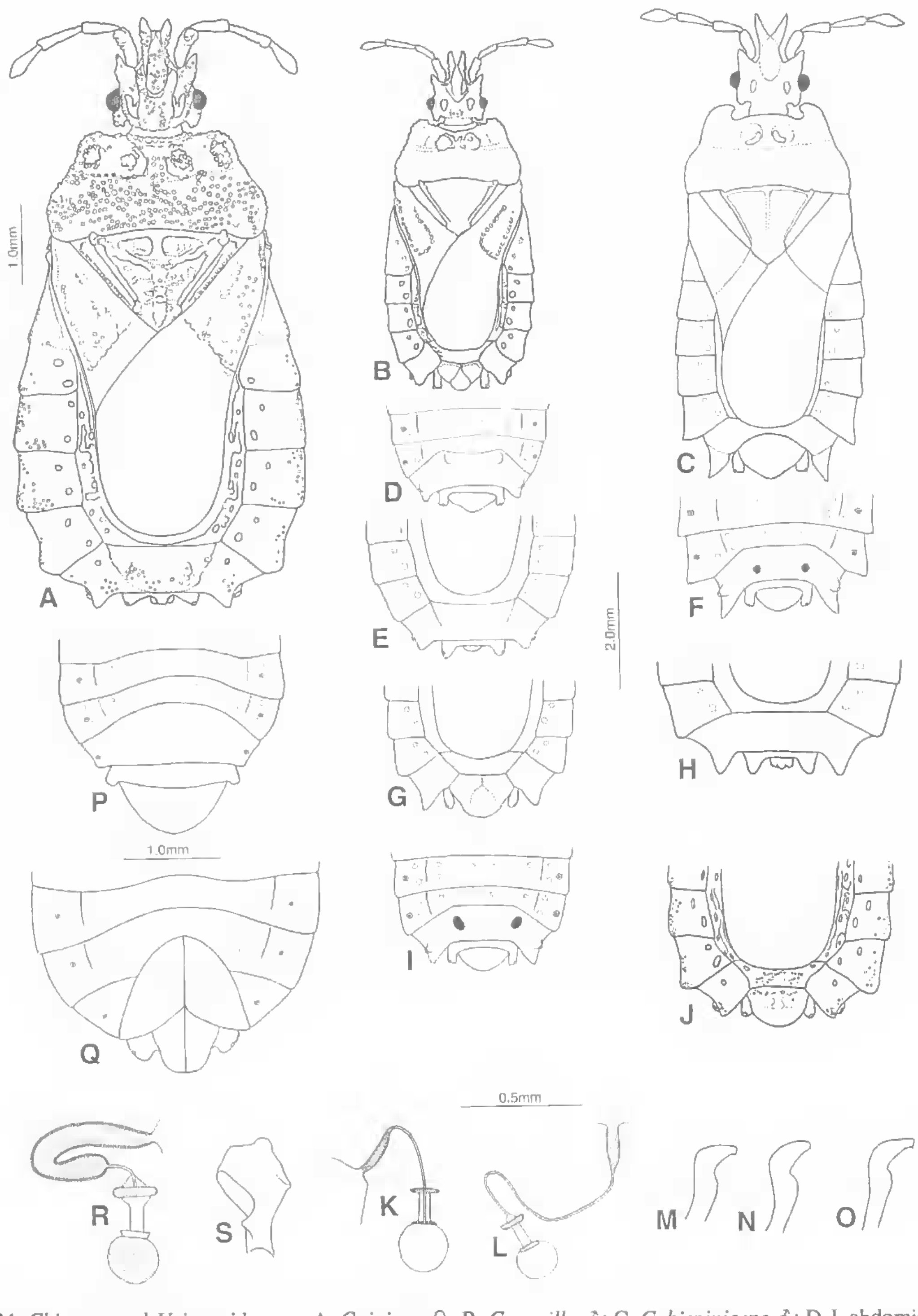

FIG. 24. *Chinessa* and *Usingerida* spp.; A, *C. iniqua* ♀; B, *C. pusilla* ♂; C, *C. bispiniceps* ♂; D-J, abdominal apices, dorsal (d) and ventral (v); D, *C. pusilla* ♂ v; E, *C. pusilla* ♀ d; F, *C. bispiniceps* ♂ v; G-I, *C. claudiae*; G, ♂ d; H, ♀ d; I, ♂ v; J, *C. iniqua* ♂ d; K-L, spermathecae; K, *C. claudiae*; L, *C. bispiniceps*; M-O, parameres; M, *C. pusilla*; N, *C. claudiae*; O, *C. bispiniceps*; P-S, *Usingerida roberti*; P, ♂ ventral apex; Q, ♀ ventral apex; R, spermatheca; S, paramere.

Chinessa iniqua Kormilev, 1971
(Fig 24A,J)

Chinessa iniqua Kormilev, 1971: 129 (descr.; figs; incl. in key); Kormilev & Froeschner, 1987: 125 (listed).

TYPE. Holotype ♂, W New Guinea, Bodem, 100m, 11km SE Oerberfaren, 7-17.vii.1959, T.C.Maa. BPBM 9081. Not examined.

MATERIAL EXAMINED. 14 specimens: NORTH QUEENSLAND: West Claudie R., Iron Range, rainforest, 50m, 6♂ 7♀, 3-10.xii.1985, GBM & DJC. PAPUA NEW GUINEA: Busu R, 50m, 1♀, 14.i.1965, J.Sedlacek, det. by Kormilev in 1972 as *Chinessa iniqua*. In QM. (QM duplicates lodged in BMNH, UQIC).

MEASUREMENTS OF AUSTRALIAN SPECIMENS Range of 2♂ and 2♀ paratypes. L: 6.92-7.08, 7.08-7.91; W: 3.00, 3.25-3.70; HL: 1.35-1.41, 1.50-1.56; HW: 1.20-1.25, 1.22-1.30; PL: 1.09-1.15, 1.09-1.19; PW: 2.50-2.66, 2.50-2.75; AS: I, 0.48-0.52, 0.48-0.56; II, 0.42-0.44, 0.44-0.50; III, 0.54, 0.56-0.60; IV, 0.50-0.52, 0.52-0.56; SL: 1.19-1.25, 1.12-1.41; SW: 1.60-1.66, 1.56-1.75; WL: 3.65-3.75, 3.70-4.25; corium length: 1.65-1.75, 1.60-1.75.

DISTRIBUTION (Fig. 25). Iron Range in Cape York Peninsula, on underside of fallen, dead wood on the ground in rainforest.

REMARKS. This species fits Kormilev's description well and agrees with the New Guinea ♀ cited above. Kormilev erected two subspecies, one from Irian Jaya (*C. iniqua iniqua*) and one from Ceram in the Moluccas (*C. iniqua ceramensis*) based on a single ♀ which differed in slight details. Until the complex New Guinea fauna is reviewed there is little point in attempting to assign the Australian population to a subspecific category.

In New Guinea this is a lowland species and its presence on Ceram shows its propensity for wider dispersal, as with *C. bispiniceps* (see above). Thus it is not surprising that it is also one of the species which has established in Cape York Peninsula. It has been taken there on only one occasion, mixed with a large aggregation of *C. claudiae*.

Clavicornia Kormilev, 1960

Clavicornia Kormilev, 1960: 167 (descr.); Kormilev, 1971: 9 (incl. in key); Kormilev & Froeschner, 1987: 128 (catalogue of spp.)

FIG. 25. Records for species of *Chinessa* and *Clavicornia* in northern Queensland.

TYPE SPECIES. *Clavicornia usingeri* Kormilev, 1960, by original designation.

DISTRIBUTION (Fig. 8E). The two described species occur in New Guinea, New Britain, north Queensland and India but unidentified specimens are known from Sarawak (Borneo) and the Malay Peninsula (QM).

DIAGNOSIS. Very small, macropterous; head wider than long; postocular margins of head not angulate or tuberculate; eyes large, sessile; antenniferous tubercles absent; clypeus short, without genal processes. Rostral atrium closed and slit-like. Antennae thick with basal segments almost approximated; segment IV without petiolate base, swollen and apically subtruncate.

Pronotum with anterior lobe much narrower than hind lobe; anterolateral angles of fore lobe truncately angulate; submedian areas of disc of fore lobe flat and depressed; sublateral areas each with a rugose longitudinal ridge which runs posteriorly on to the hind lobe and terminates at an irregular transverse ridge which crosses the middle of the hind lobe. Scutellum with a lateral tooth on each side projecting forward over hind lobe of pronotum; its centre elevated into a triradiate ridge. Hemelytra with coria long, reaching well beyond apex of scutellum; membranes larger, veinless, covering all of tergal disc inside the connexiva. Connexiva II and III fused.

Meso- and metasterna wide, fused with abdominal sternum II into a large smooth plate; sterna III, IV and V each with a broad, transverse depression across anterior half. Spiracles of II absent, spiracles of III-VI close to ventral margin and sometimes visible from above. Fore tibial combs long and upright.

REMARKS. This genus of very small mezirines is related to *Chiastoplonia*, *Acoryphocoris* and *Aphelocoris*, all of which share its small size and reduction of clypeal region of head so that the bases of the antennae become approximated. *Clavicornia* differs from all of them in loss of spiracles of the second abdominal segment and in the distinctive pattern of two longitudinal ridges on the pronotum.

There is little variation in the specimens before me from SE Asia through to Australia and the genus may be represented by a single 'stock' which has invaded the Indo-Pacific archipelago from mainland Asia. *Kiritshenkiessa* Kormilev, 1971 from a unique ♂ from south India, seems to be an apterous derivative of *Clavicornia*. I have collected 2 further probable species of *Kiritshenkiessa* from the Malay Peninsula. Apterous *Smetanacoris* Heiss, 1989 from Sabah, also appears to be a derivative of the *Clavicornia* line. All these tiny species agree with *Clavicornia* in head and pronotal structure and share its distinctive thoracic sterna. These various flightless relatives in SE Asia but not in New Guinea can be interpreted as evidence of recent migration into the eastern part of its range. The only species recorded from Australia is the type.

Clavicornia usingeri Kormilev, 1960

Clavicornia usingeri Kormilev, 1960: 169 (descr.); Kormilev, 1967a: 75 (descr. of subspp.); Kormilev & Froeschner, 1987: 128 (listed).

TYPE. Holotype ♂, Erima, Astrolabe Bay, New Guinea, 1896, Biro, in HNHM. Not examined.

REMARKS. This species has not been reported in the literature from New Guinea since it was described but I have new material from Popondetta on the mainland and from Kerevat, New Britain, the latter being the first record from the Bismarck Archipelago. Kormilev (1967d), in recording the species from two localities in Australia, erected a new subspecies to contain those populations as follows.

Clavicornia usingeri granulata Kormilev, 1967 (Fig. 27A-B)

Clavicornia usingeri granulata Kormilev, 1967d: 75 (descr.); Kormilev & Froeschner, 1987: 129 (listed).

TYPE. Holotype ♂, Iron Range, Cape York Peninsula, 16-23.xi.1965, G. Monteith, QMT6566. Examined.

MATERIAL EXAMINED. Holotype and 57 specimens: NORTH QUEENSLAND: Iron Range, Cape York Peninsula, allotype ♂, paratype ♂, 16-23.xi.1965, GBM, 4♂ 9♀, 28.iv-4.v.1968, GBM, in QM, 1♂, ANIC Berlesate No. 313, 14.vi.1971, Taylor & Feehan; Claudie R., Iron Range, 1♂, 19-25.vii.1978, J.F.Lawrence, in ANIC; West Claudie R., Iron Range, 2♂ 1♀, 3-10.xii.1985, GBM & DJC; Shiptons Flat, via Helenvale, 3♂ 2♀, 20-27.vi.1974, GBM & DJC, in QM; Moses Ck, 4km NE Mt Finnigan, 1 ♂, 14-16.x.1980, TAW, in ANIC; Big Tableland, 740m, 1♂, flight intercept trap, 20.xii.1990-8.i.1991, ANZSES; Crystal Cascades, 1♂ 2♀ paratypes, 29.xi.1965, GBM, 2♂ 2♀, 8.viii.1968, GBM; Upper Mulgrave River, 1♀ paratype 1-3.xii.1965, GBM, 4♂, 26-27.xii.1967, GBM; Wallaman Falls, via Ingham, 2♂ 4♀, 1.x.1980, GBM; Broadwater Park, 35 km NW Ingham, 50m, 5♂ 7♀, 16.xii.1986, GBM, GIT & SH, in QM. (QM duplicates lodged in BMNH, MDPI, UQIC, SAM, EH). (QM paratypes: QMT15118-15120, QMT29603-604).

DESCRIPTION. Very small, macropterous, 2.75-3.25mm long, with closed rostral atrium, 2 longitudinal ridges on pronotum. Pale reddish brown.

MALE. Head width 1.2-1.35 times length; eye large, not exserted; rostral groove partly closed posteriorly. Antennae 1.8-2.0 times head length; all segments very stout, particularly the first and fourth; segments I, III and IV with length subequal, longer than that of segment II.

Pronotum width about 1.6 times median length; anterior lobe with collar wide and separated from disc by furrows which coalesce to give a median furrow; anterolateral angles produced as short obliquely truncate flanges. Scutellum with width 1.3-1.5 times length; basal half with a transverse elevation; distal half with a median ridge. Hemelytra reaching to apical half of tergum VII; coria with 2 prominent longitudinal veins meeting distally.

Margins of connexiva II-V straight; posterior angles of connexiva VI protruding; margins of connexiva VII angulate. Paratergites of VIII clavate, longer than apex of small pygophore. Spiracles of segments III-VII situated close to lateral margin, those of V clearly visible from above. Sternum VII strongly convex beneath the pygophore.

FEMALE. As for ♂ except: divided halves of sternum VII strongly convex; paratergites of VIII long, cylindrical.

MEASUREMENTS. Holotype ♀ first, then ranges of additional 2♂ and 2♀. L: 3.16, 2.75-3.16, 3.00-3.25; W: 1.22, 1.04-1.20, 1.14-1.26; HL: 0.40, 0.42-0.44, 0.40-0.44; HW: 0.50, 0.48-0.52, 0.52-0.54; PL: 0.70, 0.64-0.68, 0.68-0.72; PW: 1.14, 1.02-1.12, 1.08-1.14; AS: I, 0.22, 0.20-0.22, 0.22; II, 0.14, 0.14, 0.14-0.16; III, 0.24, 0.22, 0.22; IV, 0.22, 0.22, 0.22; SL: 0.44, 0.36-0.46, 0.40; SW: 0.64, 0.52-0.60, 0.60-0.64; WL: 2.10, 1.76-2.00, 2.00-2.10.

DISTRIBUTION (Fig. 25). On the underside of old logs in rainforest at Iron Range, Cape York Peninsula and in the main north Queensland rainforest system between Cooktown and the Herbert River valley.

REMARKS. Kormilev separated the Australian forms as a separate subspecies on the basis of several minor features including granulation of the hind lobe of pronotum, colour and absence of a small metapleural tubercle. These features vary among the Australian and New Guinea representatives I have seen and it will probably prove difficult to sustain a viable subspecific nomenclature. I retain Kormilev's name intact. The only other described species *C. subparallela* Heiss, 1982a, from India.

Chiastoplonia China, 1930

Chiastoplonia China, 1930: 104 (descr.); Matsuda & Usinger, 1957: 167-8 (descr.; incl. in key; key to spp.); Usinger & Matsuda, 1959: 198,293 (descr.; incl. in key); Kormilev, 1971: 9, 137 (incl. in key); Kormilev, 1978: 245 (key to spp.); Kormilev & Froeschner, 1987: 123 (list of spp.)

TYPE SPECIES. *Chiastoplonia pygmaea* China, 1930 by original designation.

DISTRIBUTION (Fig 9A). 18 species range from Ceylon and south China across the Indo-Pacific Archipelago to Micronesia, Samoa and E Australia.

REMARKS. This genus comprises a group of macropterous species among which are some of the smallest Aradidae known. It is very closely related to *Acoryphocoris* Usinger & Matsuda, and, as more species are described in each genus, the distinction between the two is becoming so ill-defined that it will probably become necessary to eventually sink *Acoryphocoris* under *Chiastoplonia*. When Usinger & Matsuda proposed *Acoryphocoris* they separated it from *Chiastoplonia* principally by its closed rostral atrium. Some *Acoryphocoris* species described by Kormilev (1971) have the atrium partly open and he pointed to the elongate coria as being the principal difference shown by *Acoryphocoris*. But even this feature varies within otherwise homogeneous groups of species.

The single species previously recorded from Australia, *C. minuta* Kormilev, was only known to occur in southern Queensland and was apparently geographically remote from its nearest congeners in New Guinea. The 4 additional species recorded here from intervening areas and the extension of the range of *C. minuta* to north Queensland show that the genus is distributed along almost the whole of the eastern Australian seaboard. Four of the five known Australian species are sympatric at Iron Range in Cape York Peninsula. While it is possible that some of these species may prove to be shared with New Guinea when that fauna is better collected, at present there is no evidence that this is so.

Chiastoplonia species are very difficult to hand collect in the field because of their small size and the fact that they often coat themselves with debris. However they occur in large colonies in crevices of rough bark on large dead trees and logs and may be obtained by spraying with pyrethrum.

KEY TO AUSTRALIAN SPECIES OF *CHIASTOPLONIA*

1. Coria with a prominent longitudinal vein convexly raised above the corial surface; head and prothorax with many erect hairs, often forming linear patterns; hind lobe of pronotum usually with a prominent transverse crest of erect hairs; antero-lateral angles of pronotum with flattened flanges projecting vertically 2
   Coria without a prominent convex vein; head and prothorax virtually glabrous; pronotal hind lobe without a transverse crest of hairs; antero-lateral angles of pronotum without vertically projecting flanges 3

2(1). Anterior declivity of pronotal hind lobe with a median tubercle about as high as transverse crest; margins of connexiva VII in female forming an acute angle . . . . *bamaga* sp. nov.
   Anterior declivity of pronotal hind lobe without a conspicuous median tubercle; margins of connexiva VII in female forming an obtuse angle . . . . *minuta* Kormilev

3(1). Third antennal segment more than twice length of second; connexiva bicoloured; antero-lateral angles of pronotum with prominent, horizontal, flattened lobes . . . . *thoracica* sp.nov.
Third antennal segment less than twice length of second; connexiva concolorous; antero-lateral angles of pronotum without flattened lobes . . 4

4(3). Antennal segments 2, 3 and 4 subequal in length; pronotum with lateral margins of both fore and hind lobes rounded . . *pygmaea* China
Antennal segment 3 much longer than 2 or 4; pronotum with lateral margins of both fore and hind lobes angulate . . . . *granulata* sp.nov.

Chiastoplonia minuta Kormilev, 1965 (Figs 27E,G,I)

Chiastoplonia minuta Kormilev,1965a: 30 (descr.); Kormilev, 1965b: 5 (misident. of *Chiastplonia granulata* sp. n.); Kumar, 1967 (internal anatomy); Kormilev, 1978: 246 (incl. in key); Kormilev & Froeschner, 1987: 123 (listed).

TYPE. Holotype ♂ QMT6330, Bunya Mts,Qld., 2-4.v.1964, G. Monteith, in QM. Examined.

MATERIAL EXAMINED. Holotype and 128 specimens: NORTH QUEENSLAND: Mt Halcyon; Windsor Tbld, 1050m; Black Mtn, 4.5km N Mt Spurgeon; Mt Lewis Rd, 950m; Black Mtn, via Julatten, 800-1000m; Mt Formartine Sth, 700m; Douglas Ck, Lamb Range, 900m; Curtain Fig CSIRO Tower; Lake Barrine, 750m; Lake Eacham, 750m; Danbulla SF, in QM; Gadgarra Road, 700m; Peeramon Scrub, 750m; 3km W Bones Knob, 1100m; Crater NP, 950m; Bartle Frere, west side, 700m; PEI Road, Topaz, 580m; Wongabel SF, 800m; Mt Father Clancy, 950m; 1.5km N Upper Tully R Xing, 750m; Kirrama Range; Mt Hosie, 930m; CENTRAL QUEENSLAND: Eungella NP; Upper East Funnel Ck, in QM. SOUTHERN QUEENSLAND: Conondale Range; Mary Cairncross Park, Maleny; Mt Glorious; Bunya Mts; Lamington NP, in QM; Joalah NP, Tamborine Mt., in ANIC. NEW SOUTH WALES: Tooloom Scrub, via Urbenville, in QM; Minnamurra Falls, via Kiama; Mt Keira Scout Camp, 320m, in ANIC. (QM duplicates lodged in BMNH, DJ, SAM, EH, UQIC). (paratypes: QMT29619-29623).

DESCRIPTION. Small, 2.8-3.25mm long with erect setae on head, prothorax and scutellum, with connexiva VII of ♀ obtusely angled. Reddish brown; connexiva pale with a dark blotch at each intersegmental suture from III to VII.

MALE. Head width 1.15-1.25 times length; its dorsum with rows of setae as follows: V-shaped row on centre of vertex, longitudinal row on each side running from inner margin of eyes to posterior margin of head; postocular margins slightly convex and bearing setal tufts; antenniferous tubercles flattened, angular, reaching basal two fifths of antennal segment I. Rostral atrium broadly open; rostral groove open posteriorly. Antennae 2.5-2.7 times head length; segment III longest, a little more than twice length of II; segments I and IV subequal; segment I bent.

Pronotum with width 2.1-2.4 times median length; anterior lobe narrowed, lateral margins each raised into a vertical, longitudinal ridge which runs posteriorly on to posterior lobe to become obsolete; anterior lobe with a median sulcus flanked by two low submedian elevations; hind lobe with a transverse row of of erect setae running across full width. Scutellum with raised, setose, median ridge; lateral margins carinate but carinae terminating before apex giving apex a notched appearance; basal angles each with a laterally projecting tooth; midline of base projecting over pronotal margin. Hemelytra extending to middle of tergum VII; coria reduced but with a prominent convex vein near outer margin extending beyond apex of scutellum; membranes veinless.

Abdomen with connexival margins straight on II-VI, weakly angulate on VII. Paratergites of VII short, clavate, with spiracles laterad of apices.

Prosternum with median groove; meso- and metasterna broadly depressed; abdominal sterna II-VI each with anterior half depressed and punctate; sternum VII convex below pygophore, the convexity bearing two minute shining tubercles. Spiracles of II-III lateral, those of IV sublateral, those of V-VII ventral.

FEMALE. As for ♂ except: paratergites of VIII divergent, connexiva VII obtusely angulate; sternum VII without convexity and tubercles.

MEASUREMENTS. Holotype ♂ first, then ranges of additional 2♂ and 2♀. L: 3.16, 2.80-3.00, 3.08-3.25; W: 1.20, 1.18-1.20, 1.42-1.50; HL: 0.38,0.38-0.42,0.42-0.44; HW: 0.42, 0.48-0.50, 0.52-0.54; PL: 0.54, 0.50-0.56, 0.54-0.56; PW: 1.14, 1.16,1.28-1.30; AS: I, 0.24, 0.22-0.24, 0.24-0.26; II, 0.18, 0,.178-0.18, 0.18-0.20; III, 0.38, 0.38-0.40,0.38-0.40; IV, 0.24, 0.24-0.26, 0.26; SL: 0.52, 0.44-0.46, 0.54-0.56; SW: 0.64, 0.68-0.70, 0.72; WL: 1.80, 1.80-1.86, 2.00-2.10; CL: 0.60, 0.60, 0.64-0.70.

DISTRIBUTION (Fig. 28). Mostly in mountain rainforests from S New South Wales to the Wet Tropics around Cairns. Kormilev (1965b) recorded a ♀ in NRS (Stockholm) from 'Jarrabah' (misspelling for the label locality of Yarrabah in north Queensland) as this species. This is an unrelated species described below as *C. granulata* sp. nov.

REMARKS. *Chiastoplonia minuta* belongs to the group of species which approach the definition of *Acoryphocoris* in some respects, especially the produced outer vein of the corium. It is most closely related to the following species, *C. bamaga* sp. nov.

Chiastoplonia bamaga sp. nov.
(Fig. 27D)

TYPE. Holotype ♀ QMT11659, Bamaga, Cape York, N. Qld., 3-6.vi.1969, G.B. Monteith, in QM.

MATERIAL EXAMINED. Holotype and 76 paratypes: NORTH QUEENSLAND: 3km E of Lockerbie, Cape York, 1♀, 30.i-4.ii.1975, GBM; West Claudie R, Iron Range, 32♂ 28♀, 3-10.xii.1985, GBM,DJC; Packers Ck, nr Portland Roads, 2♂ 1♀, 6.xii.1985, GBM,DJC, in QM; 9km ENE Mt Tozer, 8♂ 4♀, 5-10.vii.1986, TAW, AC, in ANIC. (QM duplicates lodged in BMNH, DJ, SAM, EH, NMNH, HNHM, MNHG, UQIC). (paratypes: QMT29624-29676).

DESCRIPTION (Fig. 28). Small, 3.5-3.9mm long, with setae on head, thorax and scutellum, with Cx VII of ♀ acutely angled. Colour reddish brown; connexiva with slightly contrasting dark blotches on intersegmental sutures.

This species is closely related to *C. minuta* and the following description is confined to differences from that species.

Pronotum with lateral carinae of fore lobe higher; anterior declivity of hind lobe with a median, somewhat transverse, tubercle as high as crest of hind lobe; pronotum a little longer with width only 2.0-2.1 times median length. Posterolateral angles of connexiva II-VI protruding; margin of connexiva VII projecting and acutely angled. Hemelytra with several veins evident on the membrane. Connexiva less strongly patterned.

MEASUREMENTS. Holotype ♀ first, then paratype ♀. L: 3.50, 3.92; W: 1.58, 1.40; HL: 0.42, 0.44; HW: 0.56, 0.54; PL: 0.64, 0.60; PW: 1.30, 1.26; AS: I, 0.26, 0.28, II, 0.20, 0.22, III, 0.44, 0.48, IV, 0.24; SL: 0.48, 0.52; SW: 0.76, 0.72; WL: 2.20, 2.10; CL: 0.76, 0.66.

DISTRIBUTION (Fig. 28). Isolated rainforests of Cape York Peninsula.

Chiastoplonia granulata sp. nov.
(Figs 26, 27F)

Chiastoplonia minuta: Kormilev, 1965b (misident.)

TYPE. Holotype ♂ QMT11660, Cooper Creek, 18 mi. N of Daintree River, N.Qld., 21-22.v.1969, GBM.

MATERIAL EXAMINED. Holotype and 20 paratypes: NORTH QUEENSLAND: 9km ENE Mt Tozer, 2♂ 1♀, ANIC Berl.1058, 5-10.vii.1986, TAW, AC, in ANIC; Iron Range, Cape York Peninsula, 1♀, 1-9.vi.1971, GBM; West Claudie R., 1♀, pyrethrum, 3-10.xii.1985, GBM, DJC; Shiptons Flat, 280m, 1♂, flight intercept trap, 6.xii.1990-19.i.1991, Qld Mus & ANZSES; Cooper Creek, 18 mi. N Daintee River, 1♂ 3♀, 21-22.vi.1969, GBM, in QM; Yarrabah, 1♀, Mjöberg, in NRS; Wallaman Falls, via Ingham, 6♂ 3♀, 7.viii.1968, GBM, in QM. (paratypes: QMT14134-14147, QMT29609-29610).

DESCRIPTION. Small, glabrous, 2.9-3.2mm long, with granular hind pronotal lobe and reduced lateral rims of fore pronotal lobe. Colour uniformly reddish brown.

MALE. Head width across eyes usually a little greater than median length, its surface granular and glabrous; postocular tubercles slightly developed, reaching almost to outer profile of eyes; antenniferous tubercles short, angulate but bluntly so; clypeus short and narrowly pointed. Rostral atrium broadly open; rostral groove partially closed behind. Antennae with length 2.35-2.65 times head length; segment III longest, about 1.5 times length of II; segment I and IV subequal.

Pronotum width 2.0-2.1 times median length; surface glabrous, with anterior declivity of hind lobe coarsely granular and swollen in the middle; anterior lobe with a median sulcus flanked by low submedian elevations; lateral margins of fore lobe carinate and developed into a projection at half length. Scutellum glabrous, its centre with a distinct cross-shaped pattern of ridges; lateral margins carinate, with carinae terminating before apex; basal margin with sublateral teeth projecting over base of pronotum. Hemelytra reaching hind margin of tergum VII; coria very reduced, shorter than scutellum and without veins; membranes without veins.

Abdominal connexiva concolorous; posterolateral angles of connexiva III-VI slightly protruding; margins of connexiva VII strongly angulate; paratergites of VIII cylindrical, longer than pygophore and with spiracles apical.

Prosternum longitudinally grooved; meso- and metasterna depressed medially; sterna III-VI with basal portion coarsely punctate and with an apical strip raised and smooth, smooth areas becoming progressively smaller towards posterior; sternum VII entirely punctate, swollen below pygophore but without tubercles. Spiracles of II and III lateral, those of IV sublateral, those of V-VII ventral. FEMALE. As for ♂.

MEASUREMENTS. Holotype ♂ first, then ranges of additional 2♂ and 2♀. L: 2.92, 3.00, 3.08-3.16; W: 1.20. 1.20-1.22, 1.34-1.40; HL: 0.44, 0.40-0.42, 0.42-0.48; HW: 0.44, 0.46, 0.48-0.50; PL: 0.52, 0.54, 0.56-0.58; PW: 1.12, 1.10-1.12, 1.16-1.22; AS: I, 0.26, 0.24,0.28-0.30; II, 0.20, 0.20, 0.22-0.24; III, 0.34, 0.34, 0.36-0.40; IV 0.24, 0.24-0.26, 0.24-0.26;. SL: 0.40, 0.40-0.42, 0.42-0.44; SW: 0.62, 0.62-0.64, 0.64-0.66; WL: 1.80, 1.86-1.88, 1.90-2.08; CL: 0.34, 0.32-0.34, 0.30-0.32.

DISTRIBUTION (Fig. 28). Rainforest principally from lowlands from Iron Range in Cape York Peninsula south to near Ingham in N Queensland.

REMARKS. The specimen recorded from Yarrabah by Kormilev (1965b) under the name *C. minuta* belongs here.

Chiastoplonia thoracica sp. nov.
(Fig. 27C,H)

TYPE. Holotype ♂ QMT11661, Iron Range, Cape York Peninsula, N Qld, 5-10.v.1968, G. Monteith.

MATERIAL EXAMINED. Holotype and 8 paratypes: NORTH QUEENSLAND: Iron Range, Cape York Peninsula, 1♂ 2♀, 28.iv-4.v.1968, GBM, 1♂, 5-10.v.1968, GBM; West Claudie R, Iron Range, 2♂ 3♀, 3-10.xii.1985, GBM, DJC, in QM. (QM duplicate lodged in EH). (paratypes: QMT29611-29617).

DESCRIPTION. Small, glabrous, 3.0-3.4mm long, with bicoloured connexiva and prominent, forwardly directed pronotal lobes.
MALE. Head width about 1.1 times length, its dorsum with a few adpressed setae; postocular processes developed as narrow lobes reaching to outer profile of eyes; antenniferous tubercles flattened, with sharply angulate outer margins; clypeus short narrow. Rostral atrium closed; rostral groove partially closed behind. Antennae long, 2.5-2.8 times head length; segment III very long, 2.4-2.8 times length of segmet II; segments I and IV subequal.

Pronotum width slightly greater than twice median length; anterior lobe with prominently flattened anterolateral angles which extend forward as rounded lobes beyond level of collar and have an angulate lateral projection at half length of anterior lobe; posterior pronotal lobe with vestiges of a transverse ridge present on each side of middle; anterior declivity finely granulate, with a convexity at middle. Scutellum with a median ridge for full length, its disc coarsely wrinkled on each side of ridge; lateral margins carinate except at apex; basal margin with a pair of indistinct sublateral teeth projecting forward over pronotal margin. Hemelytra reaching to hind margin of tergum VII; coria extending slightly beyond apex of scutellum, lacking distinct veins; membranes with a few veins evident.

Abdominal connexiva pale with dark blotches along intersegmental sutures between segments III-VI; margins of Cx II-IV straight, posterolateral angles of V and VI projecting, margin of VII strongly and acutely angled; paratergites of VIII short, cylindrical, with spiracles terminal.

Presternum longitudinally grooved; meso- and metasterna depressed in middle; sterna III-VI punctate except for a posterior transverse smooth band on each segment; sternum VII punctate, slightly convex below pygophore. Spiracles of segment II-IV lateral, those of V-VII sublateral.
FEMALE. As for ♂ except: apices of hemelytra reaching to half length of tergum VII.

MEASUREMENTS. Holotype ♂ first, then ranges of additional 2♂ and 1♀. L: 3.42, 3.08-3.33, 3.42; W: 1.44, 1.28-1.30, 1.40; HL: 0.48, 0.44-0.48, 0.50; HW: 0.54, 0.50-0.52, 0.52; PL: 0.60, 0.56-0.58, 0.62; PW: 1.28, 1.14-1.20, 1.26; AS: I, 0.30,0.26-0.30, 0.30; II, 0.20, 0.18-0.20. 0.18; III, 0.56, 0.48-0.50, 0.50; IV, 0.28, 0.26-0.28, 0.26;. SL: 0.50, 0.44-0.48, 0.46; SW: 0.76, 0.66, 0.68; WL: 2.20, 2.00-2.10, 2.20; CW: 0.60, 0.56-0.60, 0.62.

DISTRIBUTION. Iron Range in lowland rainforest.

REMARKS. A series of 3♂ and 3♀ in QM from New Guinea (Wau, Morobe District, 3-4.ii.1966, GBM) runs to *C. thoracica* in the key presented here but differs in smaller size, more prominent connexival angles and smaller projections on CxVII. The only described species from New Guinea is *C. lobata* Kormilev, 1971, but this species differs markedly from *C. thoracica* in shape of the pronotal margins.

FIG. 26. Dorsal view of ♂ *Chiastoplonia granulata*.

Chiastoplonia pygmaea China, 1930

Chiastoplonia pygmaea China, 1930: 2 (descr., fig.); Esaki & Matsuda, 1957: 80 (Micronesia record); Usinger & Matsuda, 1959: 294 (listed); Kormilev, 1978: 245 (incl. in key); Kormilev & Froeschner, 1987: 123 (listed).

MATERIAL EXAMINED. NORTH QUEENSLAND: West Claudie R., Iron Range, 1♂, pyrethrum knockdown, 3-10.xii.1985, GBM,DJC, in QM. MICRONESIA: Peletieu I., Palau Islands, 1♂ 1♀, 25.i.1948, H.S. Dybas, in QM.

MEASUREMENTS. Iron Range ♂: L: 2.42 W: 0.98 HL: 0.31 HW: 0.40 PL: 0.43 PW: 0.88 AS: I, 0.21 II, 0.16 III, 0.24 IV, 0.21 SL: 0.36 SW: 0.43 WL: 1.62 CL: 0.45.

DISTRIBUTION (Fig. 28). Described from Samoa and recorded from the Marshall Islands (Esaki & Matsuda, 1957). Also from Palau. Iron Range in central Cape York Peninsula.

REMARKS. This minute species is recorded from Australia on the basis of a single specimen taken by pyrethrum knockdown of dead logs in lowland rainforest at Iron Range. Its presence in Australia, so far from the type locality in Samoa, would be more surprising except for the fact that other records on remote island groups in the Pacific indicate that the species has high dispersal ability. The Iron Range specimen runs to *C. pygmaea* in Kormilev's (1978) key and agrees well with specimens determined as *C. pygmaea* from Palau by Kormilev.

It is a plain, unicoloured, minute, glabrous species which differs from others in Australia by its unflanged thorax and its short, stout antennae.

Corynophloeobia gen. nov.

DESCRIPTION. Small, macropterous. Head about as long as wide; clypeus and genae greatly reduced, reaching to about 1/3 length of first antennal segment; antenniferous tubercles barely differentiated as rounded lobes; postocular tubercles absent; vertex inflated on each side of depressed midline of rear half of head. Eyes very small, not exserted, deflected towards the ventral side of the head. Rostral groove deep, bounded by raised carinae, open posteriorly; rostrum arising from a slit-like aperture anteriorly, reaching posteriorly beyond the rostral groove on to the fore margin of the prosternum. Antennae long, twice head length, thick; last segment clavate; basal segments swollen, curved, subcontiguous in front of clypeus.

Pronotum with fore lobe narrowed and with a distinct transverse furrow separating fore and hind lobes; collar not differentiated; fore lobe without sublateral or submedian elevations, its midline depressed. A weakly carinate ridge runs from fore lobe to hind lobe on each side just mesal or lateral margins. Pronotum may be subject to sexual dimorphism with these ridges interrupted and the hind lobe reduced in ♂. Margins of pronotum without tubercles or explanate projections.

Wings fully developed, slightly shorter in ♂ than ♀; corium short, reaching to apex of scutellum, without raised veins and with its apex squarely truncate; membranes large, smooth, veinless. Scutellum triangular, with an incipient median carina; its fore margin with 2 large lateral teeth and 1 small median tooth projecting forward and overlapping the hind pronotal margin. Metathoracic scent glands openings enlarged, elongate, running dorsoventrally, with enlarged evaporative area outside aperture.

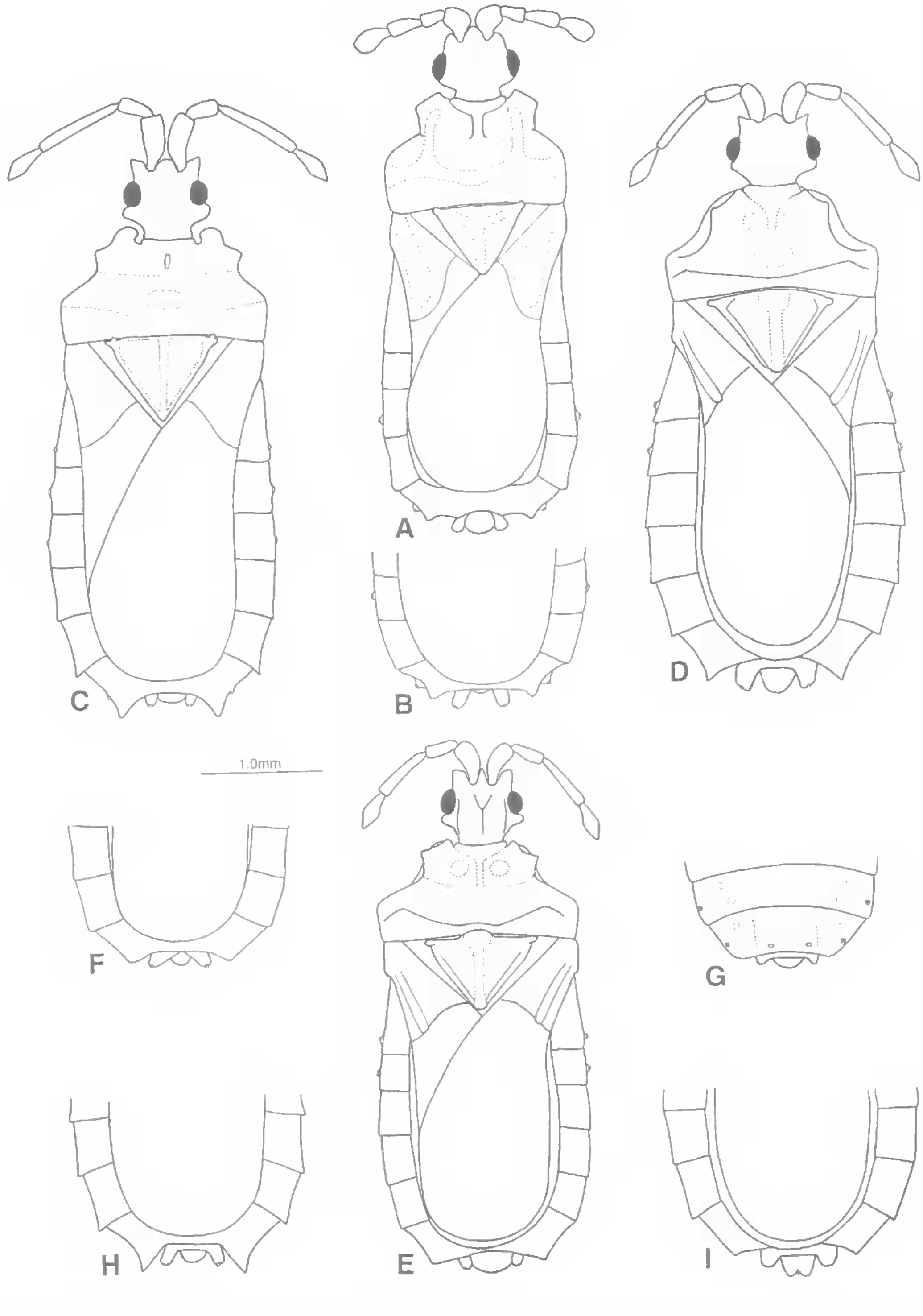

FIG. 27. A-B, *Clavicornia usingeri granulata*; A, ♂; B, ♀ dorsal abdominal apex. C-I, *Chiastoplonia* spp; C, *C. thoracica* ♂; D, *C. bamaga* ♀; E, *C. minuta* ♂; F-I, abdominal apices, dorsal (d) and ventral (v); F, *C. granulata* ♀, d; G, *C. minuta* ♂, v; H, *C. thoracica* ♀, d; I, *C. minuta* ♀, d.

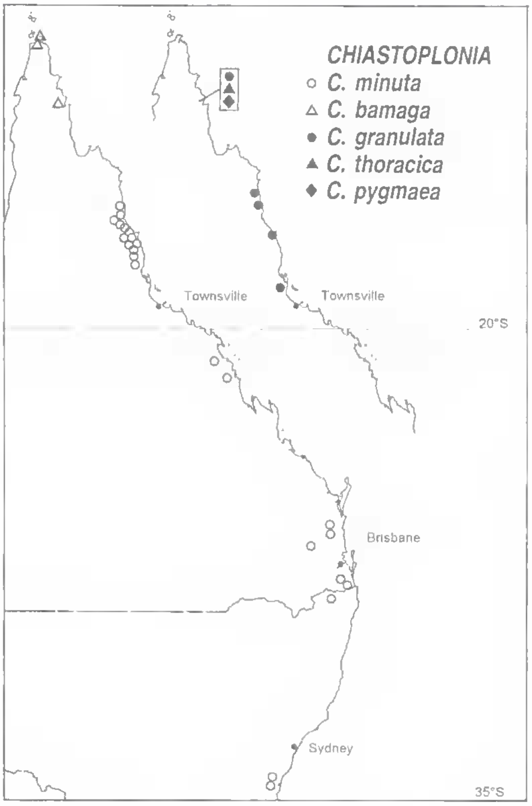

FIG. 28. Records for species of *Chiastoplonia* in eastern Australia.

Abdomen with whole of tergal disc smooth, glabrous and concealed beneath the wings. Cx II and III separated by an evident suture; sides of abdomen smooth without projecting connexival margins. Spiracles of segment II on small tubercles at lateral body margin and visible in dorsal view; spiracles of segments III-VII ventral, displaced from lateral margin. Paratergites of VIII short, rounded, the spiracle situated just external to the apex. Abdominal sterna smooth, with narrow transverse, depressed band running across anterior margin of St IV, V and VI; midlines of sterna not impressed; St VII of ♂ not specialized.

Legs very long, both femora and tibiae slender; tarsal claws with small pulvilli.

TYPE SPECIES. *Corynophloeobia dimorpha*, sp. nov.

DISTRIBUTION (Fig. 8E). Monotypic, Australian endemic, Sydney area of New South Wales.

REMARKS. This genus is allied to a group of very small macropterous genera with tergal disc entirely concealed under the hemelytra and with the spiracles of segment II present and lateral. This group comprises *Dolichothyreus* Usinger & Matsuda, *Chiastoplonia* China, *Arbanatus* Kormilev, *Aphelocoris* Usinger & Matsuda and *Acoryphocoris* Usinger & Matsuda from the Indo-Pacific as well as *Usingeria* Schouteden from the Africa-Malagasy region. The integrity of some of these genera has been eroded by the assignment of various problematic species to them since they were initially defined in Usinger & Matsuda (1959). Within this group *Corynophloeobia* differs from *Chiastoplonia* by its closed rostral atrium, from *Arbanatus* by its reduced clypeus, and from *Dolichothyreus*, *Acoryphocoris* and *Usingeria* by its truncate, abbreviated coria. It runs to *Aphelocoris* in the keys of both Kormilev (1971) and Usinger & Matsuda (1959) and I believe its nearest relationships do lie with that genus. However it differs from *Aphelocoris* by: its very different pronotum which lacks angular projections and has longitudinal ridges connecting fore and hind lobes; its simple connexival margins; its stouter antennae; and its lack of antenniferous tubercles. No species of true *Aphelocoris* occurs in tropical Australia adjacent to the known range of the genus in New Guinea and Indonesia, so this Australian form is considerably isolated geographically. The phenomenon of sexual dimorphism of thoracic structure as described for the type species of *Corynophloeobia* is not known elsewhere in the Mezirinae.

Corynophloeobia dimorpha sp. nov.
(Fig. 29A-B)

TYPE. Holotype ♂: Australia:NSW. Blue Mts, 7-900m, Megalong V., 25.xii.1986, Burckhardt, QMT29605.

MATERIAL EXAMINED. Holotype and 11 paratypes: NEW SOUTH WALES: Megalong Valley, Blue Mts, 5♂ 4♀, 25.xii.1986, Burckhardt, in QM & MNHG; Roseville, 1♀, 6.xii.1950, C.E. Chadwick, in BCRI; Greystanes, 1♀, 2.xii.1972, R. Whitehouse, in QM. (paratypes: QMT29606-29608).

DESCRIPTION (Fig. 33). Small, 2.9-3.5mm long, pale, brown, with long, thick antennae and sexually dimorphic thorax.

MALE. Head almost circular in dorsal view, roundly inflated on each side of depressed midline of hind half of head; depressed midline with a narrow, elongate, polished, longitudinal callus. Antennae long, stout; segment II shortest; segment I a little longer, thickened and curved downwards; segments III and IV longest, subequal in length. Rostrum arising from a greatly swollen atrium area.

Pronotum maximum width 1.7 times median length; fore lobe narrowed, its width about 0.75 times hind lobe width. Fore lobe with anterolateral angles roundly inflated; midline, depressed and with a median groove.

Hind lobe of pronotum transverse, narrowed, its median half smooth and depressed, its sublateral areas slightly elevated, and its humeral angles not prominent.

Scutellum triangular, its width about 1.3 times median length, its sides straight, its apex acute; foremargin with two prominent, dark, polished teeth which project forward over hind margin of pronotum; mid point of fore margin also roundly produced forward; disc of scutellum flat, irregularly and coarsely reticulate. Wings with apex of membranes reaching hind margin of Tg VI; surface of coria flat, undifferentiated into veins and slightly granular.

Abdomen with external margins of connexiva straight, smooth and unspecialised. Spiracle of segment II inserted on a tubercle and prominently visible in dorsal view. Hind margin of segment VII excavated on midline to receive the recessed pygophore. Paratergites of segment VIII short, rounded, with spiracle situated on external edge of apex. Pygophore almost completely withdrawn into segment VII, its posterior apex flat, truncate.

FEMALE. As for ♂ except: pronotum significantly better developed; forelobe with lateral margins each raised into a narrow, blunt ridge which runs posteriorly across the transverse furrow on to the hind lobe; hind lobe proportionately longer than in ♂, its central area not depressed, uniformly raised across full width. Scutellum with central disc slightly raised into an incipient median ridge. Wings reaching to almost hind margin of Tg VII. Paratergites of segment VIII bluntly triangular.

MEASUREMENTS. Holotype first, then range of 2♂ and 2♀ paratypes. L: 3.00, 2.97-3.00, 3.40-3.50; W: 1.10, 1.08-1.11, 1.25-1.31; HL: 0.56, 0.50-0.54, 0.59; HW: 0.54, 0.50-0.52, 0.52-0.56; PL: 0.62, 0.57-0.58, 0.61-0.72; pronotal forelobe length: 0.31, 0.29, 0.29; pronotal hindlobe length: 0.31, 0.29, 0.32-0.38; PW: 1.10, 1.08-1.11, 1.25-1.31; pronotal forelobe width: 0.83, 0.81, 0.81-0.86; AS: I, 0.23, 0.23-0.25, 0.25-0.27; II, 0.21, 0.19-0.21, 0.21-0.23; III, 0.29, 0.27-0.29, 0.31; IV, 0.29, 0.29, 0.31-0.32; SL: 0.38, 0.38, 0.46; SW: 0.50, 0.48, 0.630.67; WL: 1.71, 1.58-1.60, 2.19-2.25; corium length: 0.58, 0.54-0.56, 0.56-0.65.

DISTRIBUTION. Three collections, 2 from the Sydney metropolitan area and the 3rd from the Blue Mountains, W of Sydney.

REMARKS. *Corynophloeobia dimorpha* is a sclerophyll forest species associated with the Hawkesbury Sandstone which has numerous other plants and animals restricted to its habitats. The collector of the long series from the Megalong Valley, Dr D. Burckhardt, of the Geneva Museum, informs me that they were taken from a litter sample.

The curious sexual dimorphism of the pronotum is constant in all specimens of both sexes. The reduction, in the ♂, of the hind lobe of the pronotum and of the scutellum are both features often associated with alary dimorphism in tropical species. The wings are a little shorter in the ♂ than in the ♀ but it is not known if the male's flight ability is lost.

Glochocoris Usinger & Matsuda, 1959

Glochocoris Usinger & Matsuda, 1959: 199, 302 (descr., incl. in key); Kormilev, 1967d: 76 (key to spp); Kormilev, 1971: 9, 142 (inc. in key; n.sp.); Kormilev & Froeschner, 1987: 139 (catalogue of spp.; discussion of synonymy).

Mezirella Kiriishenko, 1959: 166 (descr. as subgenus of *Mezira*); Kormilev, 1967a: 533 (synonymy with *Glochocoris*).

TYPE SPECIES. *Pictinus crassicornis* Matsuda & Usinger, 1957, by original designation.

DISTRIBUTION (Fig. 8F). The 27 known species range from the Seychelles, SE Asia and Japan through to Micronesia, New Guinea and Australia. Nine species have been described from New Guinea.

REMARKS. The earliest described group of species now attributed to *Glochocoris* were originally placed in *Pictinus* which was used by early authors for small, plain, winged mezirines. The artificial nature of *Pictinus* in this old sense was highlighted by the discovery of a femoro-sternal stridulatory mechanism in a small group of Neotropical species by Usinger (1954). The type species, *P. cinctipes* Stal, 1873, was one of these stridulating forms so this provided the corner stone for a fragmentation of '*Pictinus*' by Usinger & Matsuda (1959). They divided the Indo-Pacific

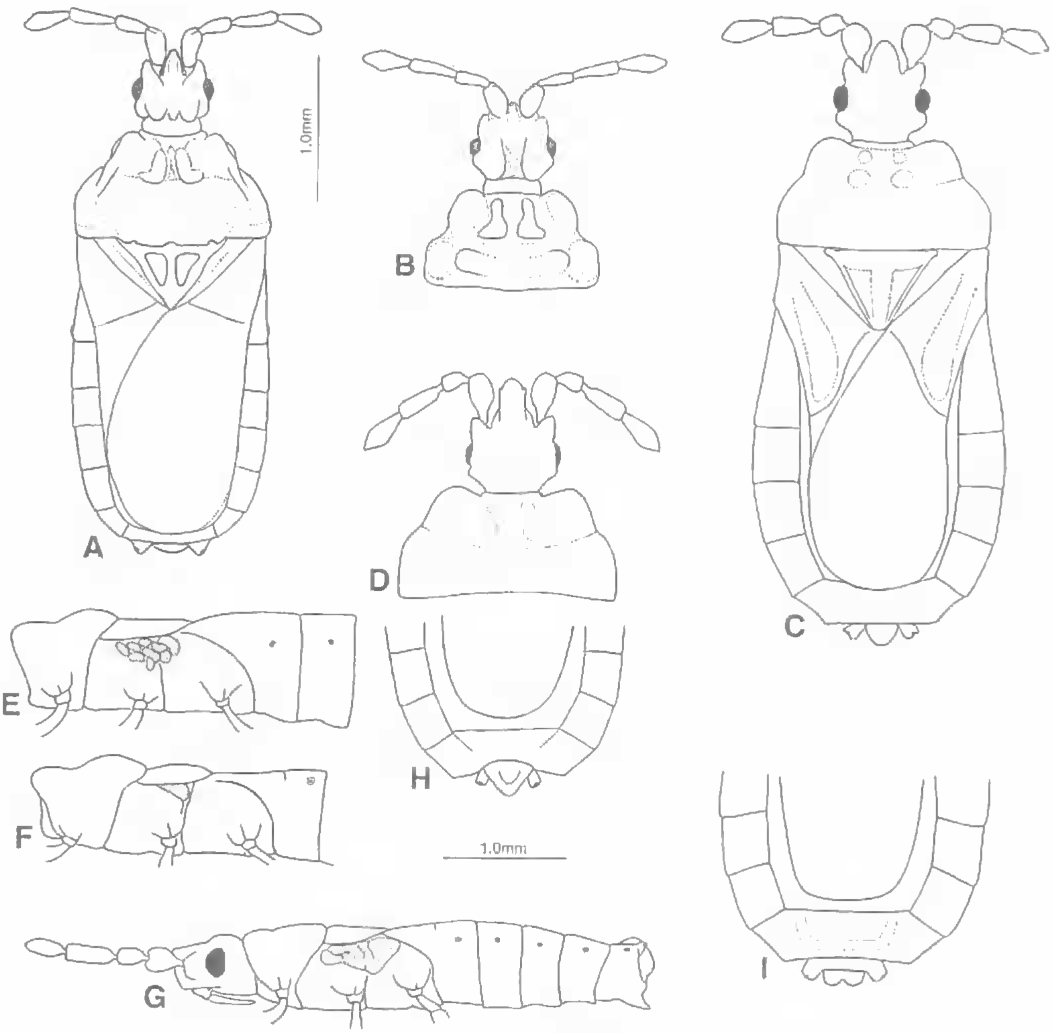

FIG. 29. A-B, *Corynophloeobio dimorpha*; A, ♀; B, ♂ head and prothorax. C-I, *Glochocoris*. C, *G. monteithi* ♂ ; D, *G. gippslandicus*; E-G, lateral views; E, *G. gippslandicus*; F, *G. monteithi*; G, *G. brisbonicus* ♂; H-I, *G. gippslandicus* dorsal abdominal apices; H, ♂; I ♀.

species into *Glochocoris* and *Pictinellus*, which differed in the absence of spiracles on the second abdominal segment in *Glochocoris*. *Pictinellus* has now fallen in favour of *Arbanatus* Kormilev, 1955c, which was not available to Usinger & Matsuda.

The two genera are widely distributed in the Indo-Pacific region but show a marked dissimilarity in the distance to which they have penetrated into the Pacific. Whereas *Arbanatus* ranges from Asia to the most remote islands of southern Polynesia, *Glochocoris*, although it extends into Micronesia, does not penetrate past the Bismarck Archipelago in the S Pacific. The reason for this may be in differential vagility of the two genera. *Glochocoris* species, though small, have heavy cuticle and their litter dwelling habits give them a tendency to coat themselves with soil which adds weight and impairs wing function. By contrast *Arbanatus* species are sub-cortical in habits with light cuticle which does not gather a soil deposit. Both genera have several species in Australia though *Arbanatus* is recorded there for the first time in this work.

The species of *Glochocoris* are very uniform and specific characters are few. The 4 Australian species can be separated into 2 allopatric pairs, the open forest *brisbanicus-gippslandicus* group and the rainforest *monteithi-abdominalis* group. The *brisbanicus-gippslandicus* pair are distinguished by a remarkable evaporative area surrounding and occluding the opening to the metapleural scent gland (Fig. 29E-G). Such structures have been overlooked and are unknown in overseas species.

KEY TO THE AUSTRALIAN SPECIES OF *GLOCHOCORIS*

1. Metapleural scent gland visible as an open, triangular aperture on the upper margin of the metapleuron; eyes well exposed in dorsal view 2
   Metapleural scent gland with distinct aperture not visible but occluded by an extensive development of vermiculate evaporative surface on the upper half of meso- and metapleura; eyes almost concealed in dorsal view 3

2(1). Posterior pair of the 4 tubercles on the fore lobe of the pronotum much larger than the anterior pair and distinctly separately from them; connexival margins of abdomen straight . . . . *monteithi* Kormilev
   Posterior pair of pronotal tubercles about same size as anterior pair and semi-fused with them; connexival margins of the abdomen slightly concave giving abdomen a sinuate profile (north Queensland) . . . . *abdominalis* Kormilev

3(1). Evaporative area of scent gland divided into many small portions; pronotum with all four tubercles of about same size . . . . *gippslandicus*, sp. nov.
   Evaporative area of scent gland incompletely divided into a few large portions; pronotum with anterior pair of tubercles almost obsolete . . . . *brisbanicus* Kormilev

Glochocoris monteithi Kormilev, 1967
(Fig. 29C,F)

Glochocoris monteithi Kormilev, 1967d: 76,77 (incl. in key; descr.); Kormilev, 1967a:541 (locality record); Kormilev & Froeschner, 1987: 140 (listed).

TYPE. Holotype ♂, Mt Glorious, SE Qld., 23.iv.1963, G. Monteith, QMT6568. Examined.

MATERIAL EXAMINED. Holotype and 262 specimens: CENTRAL QUEENSLAND: Eungella NP; SOUTH QUEENSLAND: Fraser Is, 3km N Lake Bowarrady; Amamoor SF; Cooran Tableland, 400m; Bunya Mountains; Mt Mee SF; Mt Glorious, in QM; Boombana NP; Manorina NP, in ANIC; Bald Mtn, 3-4,000', via Emu Vale; Mt Superbus; 'The Head', via Killarney; Lever's Plateau, via Rathdowney; Lamington NP; Joalah NP, Tamborine, in ANIC; Mt Tamborine, in SAM; Springbrook, in QM. NEW SOUTH WALES: Brindle Creek, Wiangaree SF, in ANIC; Tooloom Scrub, via Urbenville; Dorrigo NP, in QM; Point Lookout, via Ebor; Bruxner Park, via Coffs Harbour, in ANIC; Carrai Plateau, via Kempsey, in QM; O'Sullivan Gap Reserve, 11km NE Buladelah, 50m, in ANIC; Barrington House, via Salisbury, in QM; Lagoon Pinch, Barrington Tops; Mt Allyn, in ANIC; Megalong Valley, Blue Mts, 7-900m, in MNHG; Minnamurra Falls; Kiola Forest Park, 15km N Bateman's Bay; Batemans Bay; Cambewarra Mtn. AUSTRALIAN CAPITAL TERRITORY: Uriarra-Picadilly Circus, 800m; Picadilly Circus, 800m, in ANIC. (QM duplicates lodged in BMNH, DJ, EH, HNHM, UQIC). (paratypes: QMT29500-29521).

DISTRIBUTION (Fig. 30). Abundant in moist forests of high and low altitudes of eastern Australia from Mackay in central Queensland to the southern coast of N.S.W. and the A.C.T..

REMARKS. This species is generally confined to true rainforests but is occasionally taken in moist tree fern gullies and wet sclerophyll in the vicinity of rainforests. An exception is the isolated population in the Brindabella Ranges of the A.C.T. where no rainforest occurs. This population differs from typical forms in having the scent gland opening with some vestiges of external evaporative area. It is regarded as a relict from times when wet forests were more widespread and which has persisted in the moister gullies of this inland range.

Glochocoris abdominalis Kormilev, 1967

Glochocoris abdominalis Kormilev, 1967d: 76,78 (incl. in key; descr.); Kormilev & Froeschner, 1987: 139 (listed).

TYPE. Holotype ♂, Lake Eacham, N Qld., 23.xii.-1964, G. Monteith, QMT6569. Examined.

MATERIAL EXAMINED. Holotype and 53 specimens: NORTH QUEENSLAND: Mt Boolbun South, 950m, 2♂, 5.xi.1995, pyrethrum, GBM, DJC; Windsor Tableland, 1050m, 4♂ 1♀, 25-26.iv.1982, GBM, DKY & GIT; 2km SE Mt Spurgeon, 1100m, 2♂ 1♀, 20.xii.1988, GBM & GIT, in QM; Mt Lewis, 1010 m, ANIC Berl. 320, 1♂, 20.iv.1971, Taylor & Feehan, in ANIC; Mt Lewis Rd, 3♀, 12.x.1980, GBM; Mt Edith Rd, Lamb Ra., 900m, 2♀, 12.x.1982, GBM, DKY & GIT, in QM; Tolga Scrub, 1♀, 18.ii.1984, I.D.Galloway, QDPI; Crater NP, 950m, 2♂ 2♀, pyrethrum, 28.xii.1989; Gadgarra Road, 700m, 1♂, pyrethrum, 9.xii.1989, GBM, GIT, HJ; Upper Plath Rd, 1100m, QM Berl. 908, 1♀, 8.ii.1996, GBM; Wongabel SF, 5 km S Atherton, 1♀, 5.xii.1988, GBM & GIT; Lake Barrine, 1♂, 31.vii.1982, S&JP; Lake Eacham, ♀ allotype, 4♂ 4♀ paratypes, 23.xii.1964, GBM; Mt Bartle

Frere, W side, 700m, 1♂, 30.vii.82, S&JP; Bellenden Ker, 1♂, 7.viii.1966, GBM; Bellenden Ker, Cable Base Stn, 100m, 1♂, 25-31.x.1981, Earthwatch/QM; Millaa Millaa Falls, 1♂, 23.iv.1968, GBM, 1♂ 1♀ paratypes, 4.xii.1965, GBM; Mt Father Clancy, 9km S Millaa Millaa, 950m, 1♂, 6.xii.1988; Graham Range, 55om, 1♀, pyrethrum, 1.xii.1995, GBM; Kirrama Range, 700m, 1♂ 7♀, 2-3.x.1980, GBM; 19.4km E Blencoe Falls turnoff, Kirrama Range, 1♂ 1♀, 8.ix.1988, J. Stanisic & D. Potter; Wallaman Falls, 500m, 1♀, 1.x.1980, GBM, 1♀, 14.xii.1986, GBM, GIT & SH, in QM. (QM duplicates lodged in BMNH). (paratypes: QMT15068-15078).

DISTRIBUTION (Fig. 30). Rainforests at high and low elevations in wet tropical Queensland between the Bloomfield and Herbert Rivers.

REMARKS. This species is closely related to *G. monteithi* and replaces that widespread species in north Queensland. *Glochocoris* is not known from the rainforests at Mt Elliot and the Paluma Range in the intervening region between the ranges of *G. monteithi* and *G. abdominalis*. If intermediate forms are discovered there in future it may be necessary to review the specific status of *G. abdominalis*.

Glochocoris brisbanicus Kormilev, 1967 (Fig. 29G)

Glochocoris brisbanicus Kormilev, 1967d: 76 (incl. in key; descr.); Kormilev & Froeschner, 1987: 139 (listed).

TYPE. Holotype ♂: Brisbane, Qld., 31.x.1963, G. Monteith, QMT6567. Examined.

MATERIAL EXAMINED. Holotype and 100 specimens: CENTRAL QUEENSLAND: 5km N Mt Macartney, Cathu SF, 1♂, 21.iv.1979, GBM; Pandanus Ck, Cathu SF, 80m, 5♂ 4♀, 20.iv.1979, GBM; Bell's Gap, Sarina Range, 2♂ 1♀, 26.iv.1979, GBM; Yeppoon, Dry RF, 1♂, 27.iv.1979, GBM; Nob Ck, Byfield, 8♂ 5♀, 27.iv.1979, GBM, in QM; Byfield, ANIC Berl. 538, 3♂ 2♀, 26.x.1976, Taylor & TAW, in ANIC; Yeppoon, 1♂ 1♀ paratypes, 6.xii.1964, GBM. SOUTH QUEENSLAND: Fraser Island, Yidney Scrub, 1♂ 2♀, 3-4.xii.1975, GIT & A. Slater, in QM; Camp Milo, Cooloola, 5♂ 7♀, 17-18.iv.1982, AAC, in ANIC; Booloumba Ck, Conondale ra., 1♀, 30.x.1988, GBM; Somerset Dam, 9♂ 7♀, 24.iii.1971, GBM; Brookfield, 1♀, 8.iv.1976, A. Postle; Mt. Coot-tha, 5♂, 11-20.iii.1971, GBM, 1♀, 3.iii.1971, A.D. Moore; Brisbane, holotype, 1♂ paratype, 31.x.1963, ♀ allotype, 1♂ 1♀ paratypes, 30.x.1963, GBM, 1♂ paratype, 21.iv.1964, GBM, 1♂ 1♀ paratypes, 2.xii.1963, GBM, 1♂, 28.x.1976, P. Samson, 2♂ 1♀, 22-24.i.1975, GIT, 1♂, 5.iv.1976, A. Postle; Figtree Pocket, Brisbane, 2♂ 6♀, 5.xi.1976, V. Davies; Gold Creek, Brookfield, 1♂, 20.x.1980, V. Davies; Cunninghams Gap, 1♂, 19.iii.1976, GIT; 10 mi. S of Nerang, 1♂ 1♀, 20.iv.1976, A. Postle, 1♂ 1♀, 24.iv.1976, A. Postle, in QM. NEW SOUTH WALES: Richmond Range SF, nr Kyogle, 1♂, 13-14.ii.1983, TAW & AC; Allyn R., Chichester SF, 1♂ 1♀, 10-11.xi.1981, TAW, AC & Hill, in ANIC. (QM duplicates lodged in BMNH, EH, NMNH, UQIC). (paratypes: QMT29522-29530).

DISTRIBUTION (Fig. 30). From a little north of Mackay to the Barrington Tops region in northern N.S.W.

REMARKS. In contrast to *G. monteithi*, with which its range overlaps, *G. brisbanicus* lives in litter and bark debris around the base of trees in open eucalypt forests. In this habitat it is the only species of Aradidae to persist in the suburban environments of Brisbane. Exceptions to its usual open forest habitat are its occurrences in rainforests on Fraser Island. These rainforests are recent developments on a substrate of pure sand and have a very dry litter layer due to rapid drainage of surface moisture. They have been colonized by a number of other open forest insects such as the carabid beetle, *Pamborus viridis* Gory (Monteith, pers. obs.) to the exclusion of the normal rainforest species, e.g., *Pamborus alternans* Latreille, and the presence of *G. brisbanicus* there fits this pattern. *G. brisbanicus* occasionally occurs in dry rainforests in the northern and southern extremities of its range.

Glochocoris gippslandicus sp. nov. (Fig. 29D-E,H,I)

TYPE. Holotype ♀, Alfred Nat. Park, 200m Victoria, 21.v.1978, S. & J. Peck, rotted logs in rainforest, in ANIC.

MATERIAL EXAMINED. Holotype and 3 paratypes: VICTORIA: Mallacoota NP, 1♀, 26.v.1978, S&JP, in ANIC; Lind NP, 1♂ 1♀ 25.v.1978, S&JP, in QM. (paratypes: QMT29531-29532).

DESCRIPTION. Small, 3.3-4.0mm long, with metapleural scent gland occluded by evaporative surface divided into many small segments.

MALE. Head length 1.2-1.3 times width; postocular portions slightly protruding, rounded; eyes very narrowly exposed to dorsal view; antenniferous tubercles abbreviated, rounded; clypeus narrow, reaching to two thirds length of first antennal segment; genal processes evident as minute tubercles on each side of clypeus, before apex. Rostral groove narrow, open posteriorly.

Antennae 1.42-1.54 times head length; segments III and IV longest, subequal; segment I 1.4-1.7 times length of II.

Pronotum width 1.75-2.00 times length; for lobe with anterior pair of tubercles slightly closed placed than posterior pair and smaller than them; transverse depression between fore and hind lobes well marked and complete; posterolateral angles of hind lobe thickened and raised. Scutellum width 1.35-1.45 times length, its midline strongly raised into a ridge which tapers posteriorly. Hemelytra reaching to hind margin of Tg VI; coria reaching to half length of Cx III.

Abdomen with posterolateral angles of connexiva slightly protruding; margins of Cx VII weakly and roundly angulate; metapleural scent gland with evaporative area present as raised, callus-like structure surrounding the occluded aperture and divided into a number of discrete segments. Spiracles of II absent, those of III-VII ventral. St VII with a prominent ventral, median spine.

MEASUREMENTS. Holotype ♀ first, then paratype ♂ and range of 2 ♀ paratypes. L: 3.67, 3.33, 3.75-3.96; W: 1.58, 1.34, 1.54-1.66; HL: 0.70, 0.66, 0.68-0.72; HW: 0.58, 0.50, 0.54-0.60; PL: 0.64, 0.60, 0.70-0.72; PW: 1.28, 1.14, 1.22-1.32; AS: I, 0.28, 0.26, 0.24-0.26; II, 0.16, 0.16, 0.16-0.18; III, 0.28, 0.30, 0.30; IV, 0.30, 0.30, 0.28-0.30; SL: 0.44, 0.42, 0.44-0.50; SW: 0.64, 0.60, 0.60-0.68; WL: 2.00, 1.90, 2.10-2.20; corium length: 0.96, 0.84, 0.80-0.94

DISTRIBUTION (Fig. 30). Known from 3 localities in the eastern corner of Gippsland, Victoria.

REMARKS. This species is related to *G. brisbanicus* with which it shares the highly modified evaporative region of the scent gland. Like *G. brisbanicus*, *G. gippslandicus* may be principally an open forest species. The holotype is from rainforest but the 3 paratypes are all from open forest. The species is one of only 4 Mezirinae occurring in Victoria and is the only species confined to that State.

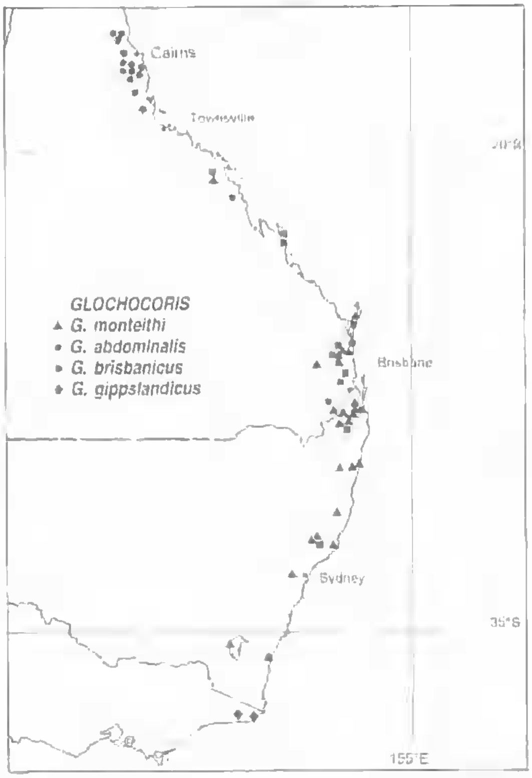

FIG. 30. Records for species of *Glochocoris* in eastern Australia.

DISTRIBUTION (Fig. 9B). From SE Asia to the outer Polynesian islands and eastern Australia.

REMARKS. *Arbanatus* extends further into the remote islands of the southern Pacific than any other Aradidae and there are species described from the Marquesas and Austral Islands in Outer Polynesia. There are about 54 currently recognized species.

Their vagile form together with their presence in Asia and absence from New Zealand suggest that they have invaded the Pacific from the west. In certain island groups there seems to have been considerable radiation of species but this may be a reflection of collecting effort. The taxonomy of the genus has been made difficult by the great number of species described from single sexes or unique specimens. There is some indication that the genus may be composite; the Asian species with broad, heavy body form and short paratergites (including the type species) contrast rather strongly with the light, elongate species with foliate paratergites found principally in the Pacific region. Heiss (1989) gave excellent

Arbanatus Kormilev, 1955

Arbanatus Kormilev, 1955c: 180 (descr.); Kormilev & Froeschner, 1987: 99 (catalogue of spp.).
Pictinellus Usinger & Matsuda, 1959: 288 (descr.); Kormilev, 1971: 144 (synonymy)

TYPE-SPECIES. *Arbanatus inermis* Kormilev, 1955, by original designation.

illustrations of *A. loriai* (Bergroth, 1894), an Asian form species from New Guinea. The genus has not been noted previously from Australia but 3 new species are described from the eastern seaboard below. *Arbanatus peninsularis* sp. nov. belongs to the group of species of Asian facies while the other two are of Pacific form.

KEY TO THE AUSTRALIAN SPECIES OF *ARBANATUS*

1. Pronotum with anterolateral angles produced forward anterior to the collar on each side; margins of Cx VII strongly lobed on each side of pygophore; paratergites of segment VIII elongate and expanded in male 2
   Pronotum with anterolateral angles not extending anterior to collar; margins of Cx VII not lobed; paratergites of segment VIII short and inconspicuous in male (North Queensland)
   . . . . *peninsularis* sp. nov.

2(1). Spiracles of segment II situated on lateral margin and visible in dorsal view; size smaller, 4.00 mm or smaller (North Queensland)
   . . . . *tropicus* sp. nov.
   Spiracles of segment II ventral and not visible in dorsal view; size greater, 4.50 mm or larger (South Queensland and northern N.S.W.)
   . . . . *frazieri* sp. nov.

Arbanatus peninsularis sp. nov.
(Figs 31, 32F,K)

MATERIAL EXAMINED. Holotype ♂, Iron Range, Cape York Pen., N Qld., 26 May-2 June, 1971, B.K. Cantrell, QMT11662.

DESCRIPTION. Small, 4.4mm long, with short paratergites and a large, triangular pygophore.
MALE. Head length width, its dorsum granular and convex; postocular margins rounded, not produced; eyes large, not exserted; antenniferous tubercles short, parallel-sided apically pointed; clypeus short, reaching to less than half length of first antennal segment; genae present as small convexities on each side of clypeal apex. Rostrum short; rostral groove wider open posteriorly. Antennae slightly more than twice head length; segments I, III and IV subequal in length, about 1.5 times length of II.

Pronotum width slightly less than twice median length; surface uniformly granular; fore and hind lobes poorly differentiated; fore lobe without median sulcus, slightly elevated behind the narrow collar; hind lobe weakly depressed in centre with a median swelling; lateral margins of pronotum converging and straight, anterolateral angles not produced anterior to collar. Scutellum with width 1.3 times length; its margins bordered; basal margin with a tooth on each side overlapping hind pronotal margin; central disc with an obscure median ridge intersected by a faint cross-bar. Hemelytra reaching almost to hind margin of Tg VII; coria apically straight, reaching to Cx III; membranes black, wrinkled.

Abdomen with margins of Cx II-VI straight; margins of VII rounded angles, not projecting; paratergites of VIII short, truncate, with spiracles apical. Pygophore large, strongly exserted, triangular in dorsal view with apex produced when seen in side view. Prosternum granular on midline; meso- and metasterna broad, granular, weakly impressed. Spiracles of segment II lateral, those of III-VI ventral and well-removed from margin, those of VII ventral but close to margin; St VII enlarged, its anterior margin convexly extending into St VI.

MEASUREMENTS. L: 4.42; W: 1.64; HL: 0.62; HW: 0.64; PL: 0.76; PW: 1.46; SL: 0.56; SW: 0.75, WL: 2.50; corium length: 1.00; AS: I, 0.34; II, 0.22; III, 0.36; IV, 0.36.

DISTRIBUTION (Fig. 33). Rainforest at Iron Range, Cape York Peninsula.

REMARKS. *A. peninsularis* is related to Asian species which share the dorsally produced pygophore of the ♂ and the relatively undifferentiated form of the pronotal dorsum. *A. malayensis* (Kormilev, 1967a) conforms to this pattern and I have a number of similar unidentified species from Java, Borneo and the Malay Peninsula. However, none of this group are known from New Guinea. *A. peninsularis* differs in its small size and straight pronotal margins.

Arbanatus tropicus sp. nov.
(Fig. 32G,I,J)

TYPE. Holotype ♂, 6m N of Babinda, N Qld., 7.viii.1966, G. Monteith, QMT11663.

MATERIAL EXAMINED. Holotype and 71 paratypes: NORTH QUEENSLAND: 11km NW Bald Hill, McIlwraith Range, 520m, 15♂ 16♀, ANIC Berl.1109, open forest, 27.vi-12.viii.1989, TAW; 15km WNW Bald Hill, McIlwaraith Range, 420m, 14♂ 14♀, ANIC Berl.1120, open forest, 27.vi.12.vii.1989, TAW, in ANIC & QM; Mt Finnigan summit, 1050m, 1♀, 3-5.xii.1990, GBM,DJC,GIT,RS,LR; Mt Halcyon, 870m, 1♂, pyrethrum, 23.xi.1993, GBM,HJ; Emerald Ck, Lamb Range, 950m, 2♂ 1♀, 11.x.1982, GBM, DKY & GIT;

Graham Range, via Babinda, 1♂, 9-10.iv.1979, GBM; 6 ml. N of Babinda, 4♂ 1♀, 7.viii.1966, GBM; Kaban, via Ravenshoe, 2♂, 25.v.1966, P. Kerridge, in QM. (QM duplicates lodged in BMNH, ANIC, EH, UQIC). (paratypes: QMT14032-14040, QMT29567-29597).

DESCRIPTION. Small, 3.50-4.00mm long, elongate, reddish, with pronotal angles produced and spiracles of segment II visible dorsally.

MALE. Head length 1.1-1.2 times width across eyes; vertex with 2 rows of large granules, remainder of dorsum finely granulate; postocular margins of head somewhat expanded and irregular with notches immediately posterior to eyes; eyes moderately exserted; antenniferous tubercles short, slightly divergent, apically angulate, reaching basal fifth of first antennal segment; clypeus narrow, apically flanked by two small, blunt genal processes, reaching to half length of first antennal segment. Rostral groove narrow, not closed posteriorly. Antennae 1.66-1.71 times head length; segment III almost twice length of II; segment I and IV subequal.

Pronotum with width 1.95-2.15 times median length; fore and hind lobes separated by a continuous transverse furrow; fore lobe with a median longitudinal sulcus, a pair of low submedian elevations and a pair of low sublateral ridges; hind lobe granular; lateral margins of pronotum sinuate at level of transverse furrow; anterolateral angles produced forward as blunt lobes on each side of the narrow collar. Scutellum with width 1.00-1.20 times length; basal and lateral margins carinate; basal teeth absent; disc depressed with a median longitudinal ridge and an indistinct cross-bar on anterior half. Hemelytra reaching to apical two thirds of Tg VII; coria apically sinuate, reaching to half length of fused Cx II and III; membranes wrinkled.

Abdomen with margins of Cx II-VI straight; margins of Cx VII with portion posterior to the sublateral spiracles produced into rounded lobes; paratergites of VIII long and apically expanded into flattened lobes bearing the spiracles on the lateral margins of apices. Pygophore long, with a median, dorsal ridge.

Thoracic sterna broad and flat; abdominal sterna with faint median impressions; spiracles of II laterally placed, those of III-VI ventral but close to margin, those of VI sublateral.

FEMALE. As for ♂ except: hemelytra shorter, not reaching apex of Tg VI; Tg VII broadly exposed; margins of Cx VII with posterior lobes smaller; paratergites of VIII shorter and broader.

MEASUREMENTS. Holotype ♂ first, then ranges of additional 2♂ and 1♀. L: 3.75, 3.50-3.67, 4.00; W: 1.26, 1.21-1.30, 1.40; HL: 0.62, 0.60-0.62, 0.62; HW: 0.52, 0.50-0.52, 0.56; PL: 0.50, 0.50-0.54, 0.54; PW: 1.08, 1.06-1.10, 1.16; AS: I, 0.26, 0.26, 0.28; II, 0.18, 0.16, 0.18; III, 0.30, 0.30-0.32, 0.32; IV, 0.32, 0.28-0.30, 0.28; SL: 0.54, 0.50-0.56, 0.58; SW: 0.54, 0.60-0.62, 0.64; WL: 2.20, 2.00-2.10, 2.24.

DISTRIBUTION (Fig. 33). Rainforest and open forest in lowlands and plateaus from the McIlwraith Range to the southern rim of the Atherton Tableland, N Queensland.

REMARKS. *Arbanatus tropicus* is closely allied to *A. frazieri* from further south in Australia and both species belong in a section of the genus which includes *longicornis* Kormilev, 1971, *abdominalis* Kormilev, 1971, *longulus* Kormilev, 1971, *simplex* Kormilev, 1971 and other species which have radiated in the New Guinea-Solomons-New Caledonia region. The systematics of the group is in some confusion and it may eventuate that *tropicus* is synonymous with one of those extra-Australian species. However the Australian species are distinct in their greater development of lobes of Cx VII.

Arbanatus frazieri sp. nov.
(Figs 4F, 5M, 32E,H,L)

TYPE. Holotype ♂, University, Armidale, NSW, 22.viii.1967, C.W. Frazier, QMT11664.

MATERIAL EXAMINED. Holotype and 32 paratypes: SOUTH QUEENSLAND: Fletcher, 1♀, 14.iv.1963, P. Kerridge, in QM. NEW SOUTH WALES: New England University Armidale, 5♂ 7♀, 22.viii.1967, C.W. Frazier; Swan Vale, 30km W Armidale, 1♂ 2♀, vi/vii.1978, R. Noske, 2♀, v.1978, R. Noske, 1♂ 1♀, ix/x.1978, R. Noske; Armidale area, 1♂ 2♀, 1978/79, R. Noske; Wollomombi Falls, 40km E Armidale, 2♂ 2♀, 29.iv.1978, R.Noske, 5♂ 1♀, 30.vi.1978, R. Noske, in QM. (QM duplicates lodged in BMNH, ANIC, EH, UQIC). (paratypes: QMT29533-29563).

DESCRIPTION. Medium-sized, 4.50-5.00mm long, elongate, with spiracles of segment II concealed in dorsal view.

This species is related to *A. tropicus* and the following description is confined to differences from that species. Size larger; pronotum with transverse furrow shallower and submedian elevations of fore-lobe barely evident; lateral pronotal margins almost straight with anterolateral

FIG. 31. Dorsal view of ♂ holotype of *Arbanatus peninsularis*.

angles less developed, extending only slightly anterior to level of collar. Scutellum wider. Paratergites of VIII in ♂ longer and narrower. Spiracles of segment II situated ventrally. Parameres as in Fig. 32L.

MEASUREMENTS. Holotype ♂ first, then ranges of additional 1♂ and 2♀. L: 4.50, 4.75, 4.50-5.00; W: 1.64, 1.72, 1.46-1.76; HL: 0.70, 0.70, 0.66-0.78; HW: 0.64, 0.62, 0.58-0.68; PL: 0.62, 0.66, 0.58-0.64; PW: 1.38, 1.40, 1.24-1.50; AS: I, 0.30, 0.30, 0.30-0.32; II, 0.18, 0.20, 0.18; III, 0.36, 0.38, 0.32-0.38; IV, 0.32, 0.32, 0.30-0.32; SL: 0.70, 0.72, 0.60-0.78; SW: 0.84, 0.74, 0.72-0.88; WL: 2.60, 2.68, 2.40-2.88; corium length: 1.08, 1.04, 0.94-1.18.

DISTRIBUTION (Fig. 33). Open forest on the granite plateaus of the Great Dividing Range in southern Queensland and northern N.S.W.

REMARKS. This species, although similar to *A. tropicus*, is geographically and ecologically well separated from that species. It differs from all other members of the genus in the ventral placement of the spiracles of the second abdominal segment. This character is generally accepted as of generic importance but *A. frazieri* is in other respects a typical member of *Arbanatus*.

It is a pleasure to name this species for one of its collectors, the late Toss Frazier, who spent many years as Curator of the insect collection at the University of New England, Armidale. Many of the other specimens were collected under bark of living eucalypts by Richard Noske during his survey of food resources of treecreeper birds in the Armidale area.

Arictus Stål, 1865

Arictus Stål, 1865: 31 (descr.); Stål, 1870: 672 (descr. of type species); Stål, 1873: 144 (subgenus of *Brachyrhynchus*); Bergroth, 1886: 59 (synonymised with *Mezira*); Usinger & Matsuda, 1959: 200, 312 (reinstated as genus; incl. in key); Kormilev, 1971: 9, 106 (incl. in key; key to spp.); Kormilev & Froeschner, 1987: 103 (catalogue of spp.).

TYPE-SPECIES. *Arictus tagalicus* Stål, 1870, first included species.

GENERIC DISTRIBUTION (Fig. 9C). *Arictus* contains 28 species which are distributed from South East Asia across the islands of the Indo-Pacific to Samoa, New Caledonia and Northern and Eastern Australia. The maximum species diversity occurs in New Guinea where 11 species are recorded.

REMARKS. *Arictus*, though proposed in 1865, failed to receive general recognition until 1959 when Usinger & Matsuda separated it from *Mezira* s. l. It contains a close-knit group of generalized macropterous species which are linked together by the distinctive, opaque, usually bicoloured, integument beset by numerous small, setigerous tubercles. These tubercles form rows,

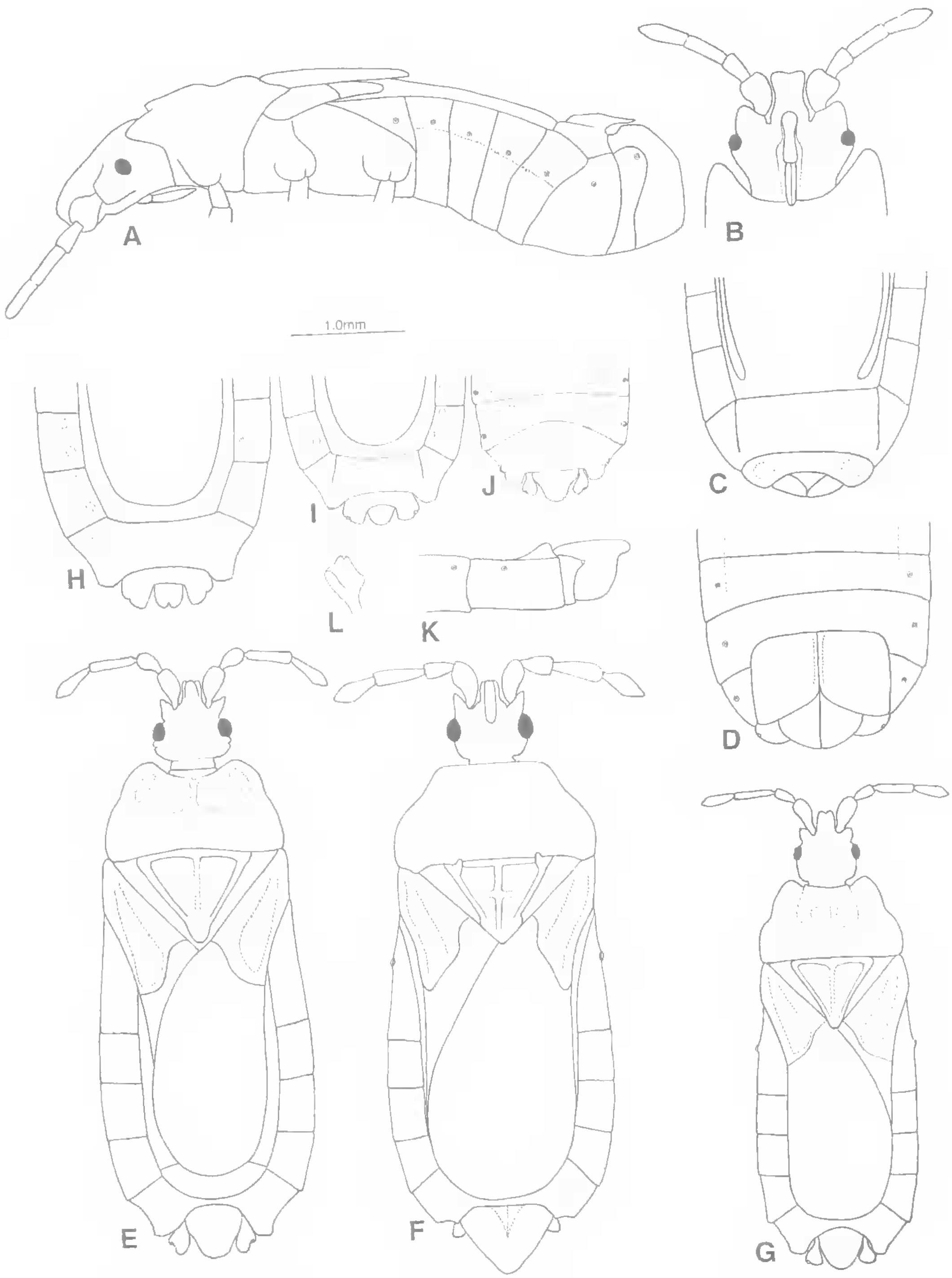

FIG. 32. A-D, *Aspisocoris termitophilus*; A, ♂ lateral view; B, ♂ head underside; C-D, ♀ abdominal apices; C, dorsal; D, ventral. E-L, *Arbanatus* spp.; E, *A. frazieri* ♂; F, *A. peninsularis* ♂; G, *A. tropicus* ♂; H-K, abdominal apices; H, *A. frazieri* ♀ dorsal; I, *A. tropicus* ♀ dorsal; J, *A. tropicus* ♂ ventral; K, *A. peninsularis* ♂ lateral; L, *A. frazieri*, left paramere, inner view.

patches and patterns on most of the body surface. The broad, median basal lobe of the scutellum and the thin, rod-like postocular tubercles also set it apart from *Mezira* s. l.. *Arictus* lacks the stridulatory ridge of fine teeth on the inner face of the ♂ parameres of *Brachyrhynchus* of the Australian region but further study is required to establish if this is a feature of *Mezira* s. l. in the cosmopolitan sense. *Arictus* shares with *Brachyrhynchus* the reduction of tarsal pulvilli to minute rods.

The taxonomy of *Arictus* is difficult and compounded by the greasy discolouration which develops on most specimens obscuring the colour patterns. In this study the previously unnoticed patterns of glabrous regions on sternum VI of the ♂ have proved highly specific.

Of the 6 species known from Australia 4 are open forest endemics (*monteithi*, *tasmani*, *dimidiatus* and *obscurus*) and 2 (*thoracoceras* and *lobuliventris*) occur in rainforest on Cape York Peninsula and in New Guinea. *A. chinai* (Kormilev), previously recorded as Australian, is believed to be based on a type specimen not from Australia.

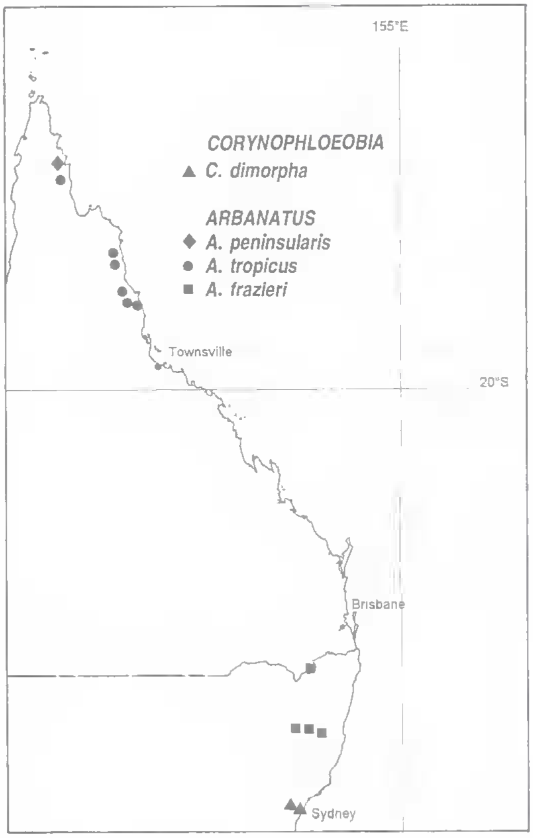

FIG. 33. Records of species of *Corynophloeobia* and *Arbanatus* in eastern Australia.

KEY TO THE AUSTRALIAN SPECIES OF *ARICTUS*

1. Antennal segment III equal in length to segment I; postocular tubercles reduced and barely discernible from other surface tubercles of the head . . . 2
   Antennal segment III distinctly longer than I; postocular tubercles present as distinct, rod-like projections behind eyes 3

2(1). Margins of Cx II-VI straight, without protruding postero-lateral angles; two longitudinal veins of corium raised and carinate; St VI of male with a small circular glabrous region on each side of middle . . . . . . *dimidiatus*, sp. nov.
   Postero-lateral angles of Cx II-VI slightly protruding; inner longitudinal vein of corium obsolete; St VI of male with a large, rectangular glabrous region on each side of middle . . . *tasmani* (Kormilev)

3(1). Setigerous tubercles of hind lobe of pronotum elongate, much higher than wide; first antennal segment with numerous, long tubercles; spiracles of VIII almost apical; angles of Cx VII of ♂ longer than paratergites of VIII . . . . *lobuliventris* (Kormilev)
   Setigerous tubercles of pronotal hind lobe shorter, not as high as wide; first antennal segment without numerous long tubercles; spiracles of VIII inserted well before apex; paratergites of VIII longer than angles of VII 4

4(3). Postero-lateral angles of Cx II-VI not protruding; postocular tubercles not surpassing outer margins of eyes; antero-lateral angles of pronotum not projecting forwards . . . . *monteithi* (Kormilev)
   Postero-lateral angles of Cx II-VI protruding; postocular tubercles extending beyond outer margins of eyes; antero-lateral angles of pronotum projecting forwards 5

5(4). Spiracles of VII much closer to margin than those of VI; margins of scutellum constricted before apex; segment IV of antenna thinner than III, not clavate . . . . *obscurus*, sp. nov.
   Spiracles of VI and VII about equidistant from margin; margins of scutellum straight; segment IV of antenna clavate, thicker than III . . . . *thoracoceras* (Montrouzier)

Arictus monteithi Kormilev, 1965
(Figs 2C, 4I, 5N, 34B,I,L,Q,T)

Arictus monteithi Kormilev, 1965a: 32 (descr.); Kormilev, 1965b: 5 (locality records); Kormilev, 1967c: 299 (mentioned); Kormilev, 1967a: 542 (locality records); Kumar, 1967 (internal anatomy);

Monteith, 1968: 46 (locality record); Kormilev, 1971: 107 (incl. in key); Kormilev & Froeschner, 1987: 105 (listed).

TYPE. Holotype ♂, Dunwich, Stradbroke Is., SE Qld., 27.iv.1963, G. Monteith, QMT6324. Examined.

MATERIAL EXAMINED. Holotype and 330 specimens; NORTHERN TERRITORY: Darwin; Port Darwin; 30ml E Darwin; Adelaide R., in BMNH; Fogg Dam, 53km S Darwin, in ANIC; 22km ESE Humpty Doo, in MDPI; Howard River; Bathurst Is.; Groote Island, in SAM; Bathurst Is., Cape Fourcroy; Melville Is., Pularumpi, in NTM; Swim Creek Point, Stuart Stn; Horn Islet, Pellew Group; Keo River, Victoria Hwy, in QM. NORTH QUEENSLAND: Eet Hill, Moa Island, Torres Strait; Prince of Wales Island, Torres Strait, in QM; Badu Island, Torres Strait, in AM; Lockerbie, Cape York; Cowal Creek, via Bamaga; Iron Range; Scrubby Ck, Iron Ra., in QM; 13 km ENE Mt Tozer; 18km ENE Mt Tozer; 2km NE Mt Tozer; Andoom, via Weipa; Kerr Point, Weipa; Upper Lankelly Creek, via Coen; Rocky R., Silver Plains; Massy Creek, Silver Plains; Homestead, Silver Plains, in QM; 3km NE Mt Webb N; 14 km NW Hopevale; 7 km N Hopevale; Mt Cook NP; 1km SE Mt Cook, in ANIC; 15 ml. SW Normanton; Ellis Beach, in QM; Emerald Ck, via Mareeba, in MDPI; Redlynch; 3.5km on Kuranda-Mareeba Rd, in BMNH; Kuranda, in UQIC; Hann Tableland Radar Stn, 800-900m; Upper Station Creek, 6 ml. W Kuranda; Wallaman Falls; '40-mile Scrub', via Mt Garnet; 2.4km E Blencoe Falls turnoff, Kirrama SF; Cape Pallarenda, Townsville, in QM; Townsville; Inkerman, nr Townsville, in BMNH; Magnetic Island. CENTRAL QUEENSLAND: Greta Creek, 20 ml. N of Proserpine; Cannonvale; Springcliffe; Finch Hatton Gorge; Stockyard Ck., 120ml. S Mackay; Blackdown Tableland, in QM; Moura; Awoonga Dam, Boyne River, in QDPI. SOUTH QUEENSLAND: Fraser Island; 5km N Ocean Lake, Fraser Is.; Gayndah; Carnarvon Gorge; Camp Milo, Cooloola, in ANIC; Yarraman SF; Maryborough, 1♂ 1♀ paratypes; Balfour Range, Benarkin; Beerwah, in QM; Bundaberg; Coulston Lakes, Ban Ban Ra., in ANIC; Kingaroy, 1♀ paratype; Petrie; Brookfield 1♂ paratype, in QM; Maroochy River; Dalby, in AM; Braemar SF, via Kogan, GBM; Gatton, in QM, in BCRI; Harlin; Broadwater; Toowong; Sunnybank, in QDPI; Brisbane, in ANIC; 2♂ 2♀ paratypes, 1♀ paratype; Acacia Ridge, 1♂ paratype; Hollywell, 1♂ paratype; Mt Gravatt; Greenbank; North Pine River; Stradbroke Island, ♀ allotype, 1♂ 1♀ paratypes; Emu Vale; Mt French; Lamington NP; Numinbah Valley; Levers Plateau, via Rathdowney; Stanthorpe; Mt Tully, via Stanthorpe; Nundubbermere Falls, 25km SW Stanthorpe; Wallangarra, 1♀ paratype, in QM; 'Queensland' in BMNH. NEW SOUTH WALES: Tooloom Plateau, via Urbenville, in QM; Brewarrina, in ANIC; Boggabri-Tamworth; Brooklana, East Dorrigo; Raymond Terrace nr. Tottenham; 6km SE Mt Harris, in AM; 3km N Lansdowne, via Taree, in QM; Williamstown, in BCRI; 10km ESE Moruya, Doyen & Lawrence, in ANIC. (QM duplicates lodged in DJ, EH) (paratypes: QMT26339-26357).

DISTRIBUTION (Fig. 35). One of the commonest and most widespread aradids in Australia occurs from the Northern Territory across Cape York Peninsula (including the Torres Strait Islands) and along the coast to Moruya in S N.S.W.

REMARKS. This is a subcortical species of open forests found in aggregations under bark of a wide range of log types. It is the only species of *Arictus* in the Northern Territory and reaches further south than any other species along the east coast. Although it extends far out into the islands of Torres Strait (to Badu and Moa islands) it has not yet been recorded from the New Guinea mainland. However it will probably eventually turn up on the southern coast of that island.

It is rather isolated taxononically among the other Australian species of *Arictus* by virtue of the broad, little-projecting, anterolateral angles of its pronotum.

Arictus tasmani (Kormilev, 1955)
(Fig. 34D,H,O,V)

Mezira tasmani Kormilev, 1955d: 492 (descr.); Usinger & Matsuda, 1959: 381 (listed).
Arictus tasmani: Kormilev, 1965a: 32 (locality records); Kormilev, 1965b: 5 (locality record); Kumar, 1967 (internal anatomy); Kormilev, 1971: 107 (incl. in key); Kormilev & Froeschner, 1987: 105 (listed).

TYPE. Holotype ♀, Australia, N.S.W., in HNHM. Not examined. Recently collected specimen compared with type on my behalf by Dr T. Vásárhelyi.

MATERIAL EXAMINED. 17 specimens. SOUTH QUEENSLAND: Bulburin SF, 2,000', via Many Peaks, 1♂, 12-15.iv.1974, I. Naumann; Yarraman, 1♂, 21.v.1970, N. Heather; Monsildale, 1♂, 17.iv.1963, GBM; Maleny, 1♂, 3.vii.1966, B.F. Ingram; Stradbroke Island, 1♂, 27.iv.1962, GBM, 1♂, 9.v.1964, GBM, 1♂, 2.v.1972, GBM, 3♂, 29-30.iv.1972, 2♂, 27.iv.1966, J.E. Dunwoody, 1♂, 17.ix.1915, H. Hacker; Mt French, via Boonah, 1♂, 15.x.1983, GBM, in QM; Highvale, 1♀, 18.iii.1969, M. Schneider, in UQIC; Gatton, 1♀, 11.iii.1937, A. May, in QDPI; Dunwich, 1♂, 6.iv.1984, R. de Keyzer, in AM. NEW SOUTH WALES: Tweed River, 1♂, 1904, W.W.F., in BCRI. (duplicate lodged in BMNH).

DISTRIBUTION (Fig. 35). Open forests of coastal S Queensland. The type is labelled as being from New South Wales but the only record available to authenticate this is one specimen taken in 1904 at the Tweed River in the extreme NE of that State.

REMARKS. This is a rare species over most of its range but is common on Stradbroke Island where it coexists with *A. monteithi* under loose bark of *Casuarina* logs.

Arictus tasmani is closely related to *A. dimidiatus* and both species are separable from all other Australian *Arictus* by their short third antennal segment.

Arictus dimidiatus sp. nov.
(Fig. 34A,N,U)

TYPE. Holotype ♂, Stockyard Creek, 120 ml. S of Mackay, 4.i.1965, G.B. Monteith, QMT11665.

MATERIAL EXAMINED. Holotype and 1 paratype ♂: CENTRAL QUEENSLAND: Stockyard Creek, 120 ml. S of Mackay, 1♂, 4.i.1965, GBM, QMT26375.

DESCRIPTION. MALE. Small, obscurely bicoloured, 7.3-7.5mm long.

Head length equal to width; postocular tubercles reduced, barely evident; vertex with 4 longitudinal rows of high tubercles; a single row of tubercles above each eye; antenniferous tubercles reaching to about 2/5 length of first antennal segment; clypeus with coarse tubercles dorsally and apically, its apex slightly surpassing half length of first antennal segment. Antennal length 1.4-1.5 times head length; segment III subequal in length to I; segment IV not thicker than III and barely clavate.

Pronotum with maximum width 2.43-2.46 times median length; fore lobe with antero-lateral angles projecting laterally but not anteriorly; collar distinct; submedian glabrous discs surrounded by a single ring of tubercles; sublateral ridges each consisting of about 12 tubercles in 2-3 rows; hind lobe not much wider than fore lobe, its surface uniformly covered with squat, setigerous tubercles. Scutellum with width 1.25-1.18 times length; median carina not prominent, its position marked by a double row of tubercles which become dispersed on posterior half; lateral margins tuberculate and moderately pinched in before apex. Hemelytra reaching to hind margin of Tg VI; coria extending to about half length of Cx III; both longitudinal veins of coria carinate, the outer tuberculate, the inner virtually bare.

Abdominal Cx II-VI with margins straight and posterior angles not protruding; Cx VII with posterior lobes subquadrate, reaching almost to apex of pygophore; paratergites of VIII broad, blunt, longer than pygophore, and with spiracles lateral, subapical. Pygophore with a glabrous, dorsal, triangular depression flanked by a raised flange of tubercles on each side posteriorly. Parameres as in Fig. 34U. Midline of meso-and metasterna and abdominal St II-VII all with a smooth, shallow sulcus; St VI with a raised, circular, opaque callus on each side of middle between inner and sublateral glabrous areas. Spiracles of segments II-VII ventral, far from margin.

FEMALE. Unknown.

MEASUREMENTS. Holotype ♂ first, then paratype ♂. L: 7.50, 7.33; W: 3.25, 3.08; HL: 1.28, 1.26; HW: 1.26, 1.30; PL: 1.14, 1.10; PW: 2.80, 2.67; SL: 1.46, 1.36; SW: 1.72, 1.56; WL: 4.17, 4.00; corium length: 1.74, 1.60; AS: I, 0.62, 0.58; II, 0.30, 0.32, III, 0.62, 0.60; IV, 0.36, 0.36.

DISTRIBUTION (Fig. 35). Only the type locality in central coastal Queensland.

REMARKS. The two known specimens were collected in association with *A. monteithi* but the species is actually related to *A. tasmani* which occurs a little further south. *A. dimidiatus* is the only open forest aradid confined to central Queensland.

Arictus thoracoceras (Montrouzier, 1865)
(Fig. 34E,G,P,W)

Aradus lugubris Boisduval, 1835: 642 (preoccupied).
Aradus thoracoceras Montrouzier, 1865: 107 (descr.).
Arictus thoracoceras Stål, 1870: 672; Usinger & Matsuda, 1959: 314 (listed); Blöte, 1965: 26 (locality records); Kormilev, 1967a: 542 (locality records); Kormilev, 1967c: 299 (locality records); Kormilev, 1971: 106, 107, 112 (redescr.; locality records); Kormilev & Froeschner, 1987: 105 (listed).
Crimia thoracocera Walker, 1873: 21 (locality record).
Brachyrhynchus thoracoceras Bergroth, 1886: 59; Lethierry & Severin, 1896: 43 (listed).
Mezira thoracocera Kormilev 1953: 340 (locality record); Kormilev, 1955d: 501 (redescr.; locality records).

TYPE. Montrouzier described this species from New Caledonia. The type material is presumed to have been in his collection which was dispersed among different collections in Europe. However, Kormilev (1971) could not locate Montrouzier material of *Aradus thoracoceras* and the type is regarded as being lost.

MATERIAL EXAMINED. 34 specimens: NORTH QUEENSLAND: Iron Range, Cape York Pen., 5♂ 6♀, 1-9.vi.1971, GBM, 1♀, 26-31.v.1971, 1♀, 5-

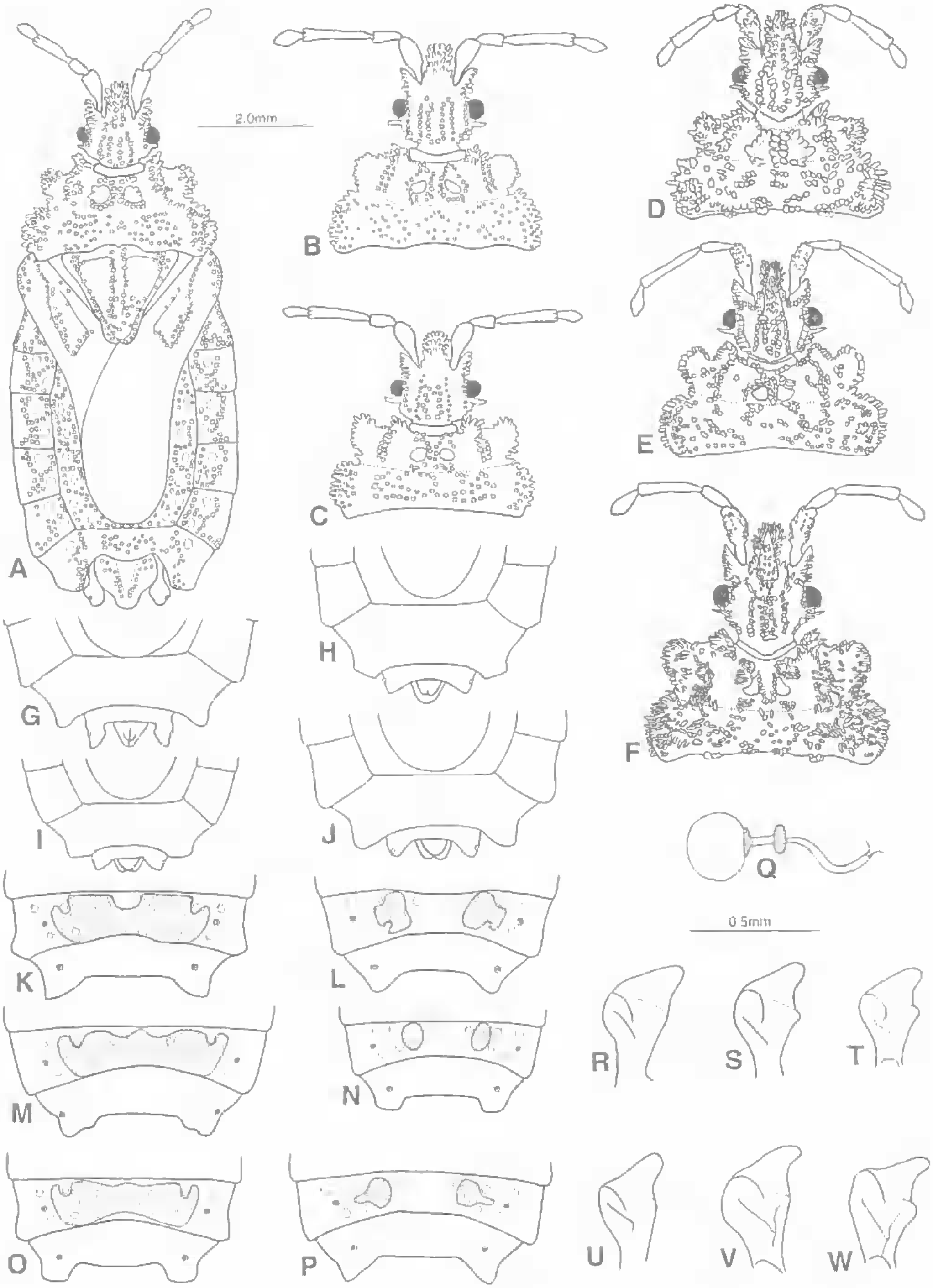

FIG. 34. *Arictus* spp.; A, *A. dimidiatus* ♂; B, *A. monteithi*; C, *A. obscurus*; D, *A. tasmani*; E, *A. thoracoceras*, F, *A. lobuliventris*; G-I, ♀ dorsal abdominal apices; G, *A. thoracoceras*; H, *A. tasmani*; I, *A. monteithi*; J, *A. lobuliventris*; K-P, ♂ ventral abdominal sterna VI and VII; K, *A. lobuliventris*; L, *A. monteithi*; M, *A. obscurus*; N, *A. dimidiatus*; O, *A. tasmani*; P, *A. thoracoceras*; Q, *A. monteithi*, spermatheca; R-W, left parameres, inner view; R, *A. lobuliventris*; S, *A. obscurus*; T, *A. monteithi*; U, *A. dimidiatus*; V, *A. tasmani*; W, *A. thoracoceras*.

10.v.1968, GBM, 2♂ 3♀, 30.vi.-4.vii.1977, GBM, 1♂ 2♀, 16-23.xi.1965, GBM; West Claudie R., Iron Range, 4♂ 1♀, 3-10.xii.1986, GBM & DJC; East Claudie R., Iron Range, 1♀, 6.xii.1986, GBM & DJC; Cooper Creek, 10 ml. N of Daintree R., 3♀, 2.v.1970, GBM; Upper Daintree River, 2♂ 2♀, 27.xii.1964, GBM, in QM. (QM duplicates lodged in BMNH, ANIC, MDPI, UQIC)

DISTRIBUTION (Fig. 35). New Caledonia, Solomon Islands, Bismarck Archipelago, New Guinea, Philippines and Cape York Peninsula; in rainforests.

REMARKS. *Arictus thoracoceras* has been a problematic name in the Australian aradid fauna, firstly because the lack of type material has made fixation of the species' identity difficult, and secondly because it is not known on what material early literature records from Australia are based.

Although it was described from New Caledonia there has been little subsequent material seen from that island. Kormilev (1955d) redescribed it from New Guinea and Woodlark Island specimens and then redescribed it again in 1971 from a New Caledonian ♂ in the Los Angeles County Museum of Natural History. This latter specimen is the first recorded from the type locality since Montrouzier's 1865 description and since it is the only species of *Arictus* known from New Caledonia this description is regarded here as definitive.

The species was first listed for Australia by Lethierry & Severin (1896) but they do not indicate the basis for their so doing. It is apparently on this listing that subsequent authors (e.g., Usinger & Matsuda, 1959) also include Australia in the species range but Kormilev (1967c) questioned its authenticity and suggested that it may be based on specimens of the widespread *A. monteithi*, which was not named at the time of Lethierry & Severin. This may well be true because although genuine *A. thoracoceras* is recorded from Australia in the present work its distribution is limited to remote regions from which it is doubtful that material would have been available last century. The specimens here listed from rainforests of Cape York Peninsula agree both with Kormilev's (1971) redescription of the New Caledonian specimen and with New Guinea material identified by Kormilev as *thoracoceras*.

Arictus obscurus sp. nov.
(Fig. 34C,M,S)

TYPE. Holotype ♂, Homestead, Silver Plains, via Coen, N. Qld., 11.xii.1964, G. Monteith, QMT11666.

MATERIAL EXAMINED. Holotype and 18 paratypes. NORTH QUEENSLAND: Cape York, 1♂ 2♀, in ANIC; Terry Beach, Bamfield Head, Prince of Wales Island, Torres Strait, 7♂ 2♀, 2.vii.1976, E. Cameron, 1♀, 20.vi.1976, I. Loch; Iron Range, 1♂ 1♀, 26.v.1974, M. Walford-Huggins; Rocky River, Silver Plains, 1♂, 14-16.xii.1964, GBM; Homestead, Silver Plains, 5♂ 1♀, 11.xii.1964, GBM, in QM. (QM duplicate lodged in ANIC) (paratypes: QMT26358-26374).

DESCRIPTION. Medium sized, 7.8-9.5mm long, with indistinct bicoloured pattern and with spiracles of VII displaced towards margin.

MALE. Head length 1.07-1.10 times width across eyes; vertex with 2 median, longitudinal rows of large tubercles flanked on each side by a row of smaller tubercles; a single row of small tubercles above each eye; postocular tubercles straight, exceeding outer margin of eyes; antenniferous tubercles reaching basal third of first antennal segment; clypeus with tubercles on dorsal surface smaller than those on its apex; clypeus reaching almost 2/3 length of first antennal segment. Antennal length 1.65-1.77 times head length; segment III longest; segment IV a little longer than II; segment IV barely clavate, not thicker than segment III.

Pronotum width of hind lobe 2.41-2.50 times median length; fore lobe with anterolateral angles projecting anteriorly and laterally; lateral margins deeply notched between fore and hind lobes; submedian glabrous discs separated by a median, double row of tubercles and with a cluster of tubercles anteriorly and posteriorly; sublateral elevations each bearing about 18 small, crowded tubercles; hind pronotal lobe surface with short squat tubercles which are sparse in centre. Scutellum width 1.07-1.15 times length; median carina obscure on posterior half; scutellar surface with tubercles sparse and confined to posterior half; lateral margins constricted subapically. Hemelytra reaching to a little beyond hind margin of Tg VI; coria with veins weakly carinate and both tuberculate.

Abdominal Cx II-VI with posterolateral angles slightly protruding; Cx VII with angulate posterior margins reaching to level of apex of pygophore; paratergites of VIII with apices just longer than pygophore, with spiracles lateral, subapical. Pygophore with an obscure dorsal, triangular depression. Parameres as in Fig. 34S.

Midline of thoracic and abdominal sterna all with a very fine sulcus; St VI with an extensive glabrous region on each side of middle (Fig. 34C). Spiracles of segments II-VI ventral far from margin; those of VII displaced close to lateral margin but not visible from above.

FEMALE. As for ♂ except: hemelytra not quite reaching hind margin of Tg VI; apex of segment IX longer than paratergites of VIII.

MEASUREMENTS. Holotype ♂ first, then ranges of additional 2♂ and 2♀. L: 8.33, 7.83-8.33, 8.83-9.50; W: 4.00, 3.50-3.92, 3.92-4.25; HL: 1.46, 1.40-1.50, 1.54-1.56; HW: 1.34, 1.28-1.36, 1.42-1.44; PL: 1.28, 1.20-1.28, 1.26-1.34; PW: 3.08, 2.80-3.16, 3.16-3.33; AS: I, 0.70, 0.70-0.80, 0.72-0.74; II, 0.38, 0.34-0.40, 0.40-0.42; III, 0.96, 0.90-1.00, 1.04; IV, 0.42, 0.40-0.46, 0.42-0.46; SL: 1.68, 1.48-1.68, 1.68-1.80; SW: 1.80, 1.72-1.88, 1.94-2.00; WL: 5.00, 4.50-5.00, 5.00-5.25; corium length: 2.00, 1.80-2.00, 1.96-2.20.

DISTRIBUTION (Fig. 35). Open forest from the southern islands of Torres Strait south to the Coen district of Cape York Peninsula.

REMARKS. This species is similar to *A. thoracoceras* in its long postocular tubercles and in the form of the pronotum. However, the displaced spiracles of segment VII and the glabrous area of St VI of the ♂ set it clearly apart. It is unusual in being an open forest species confined to the northern part of Cape York Peninsula and in this respect it resembles *Neuroctenus yorkensis*. Both are closely related to rainforest species shared with New Guinea (*Neuroctenus eurycephalus* and *Arictus thoracoceras*).

Arictus lobuliventris (Kormilev, 1953) (Fig. 34F,J,K,R)

Mezira lobuliventris Kormilev, 1953: 340 (descr.); Kormilev, 1955d: 499 (descr. of ♀; locality records).
Arictus lobuliventris: Usinger & Matsuda, 1959: 314 (generic transfer); Kormilev, 1967c: 298 (locality record); Kormilev, 1971: 107, 111 (incl. in key; locality records); Kormilev & Froeschner, 1987: 104 (listed).

TYPE. Holotype ♂, Buin, Bougainville, 1930, H. Hediger, in NMB. Not examined. Kormilev (1955d) designated a ♀ from New Guinea in HNHM as an allotype but since this was after the original description it is invalid.

MATERIAL EXAMINED. 11 specimens: NORTH QUEENSLAND: Iron Range, Cape York Peninsula, 3♂ 7♀, 16-23.xi.1965, GBM, 1♂, 21.iv.1975, M.S. Moulds, in QM. (QM duplicate lodged in BMNH).

DISTRIBUTION (Fig. 35). Rainforest at Iron Range, Cape York Peninsula; widespread in New Guinea, the Solomon Islands, the Bismarck Archipelago and the Philippines.

REMARKS. This is the first record for this species from Australia. It brings to 4 the *Arictus* species known from Iron Range which is the only Australian rainforest tract with more than 1 species (*thoracoceras* and *lobuliventris*). The other two (*monteithi* and *obscurus*) occur there in open forest.

Arictus chinai (Kormilev, 1955)

Mezira chinai Kormilev, 1955d: 550 (descr.; fig.).
Arictus chinai Usinger & Matsuda, 1959: 314; Blöte, 1965: 25 (record from Sumbawa); Kormilev, 1971: 107 (incl. in key); Kormilev & Froeschner, 1987: 104 (listed).

TYPE. Holotype ♀, Dammer Is, Australia, in HNHM (not examined).

REMARKS. There is no Dammer Island in Australia and it is presumed that this record refers to Damar Island (spelt variously Damma, Dammer) to the east of Timor in eastern Indonesia. The recording of a specimen of *A. chinai* from nearby Sumbawa by Blöte (1965) supports this contention. A ♀ *Arictus* labelled 'Damma I. 92-44' is in the British Museum and register information indicates it was collected by J.J. Walker who visited the island in 1891 (Walker, 1894). However this specimen does not accord with certain aspects of Kormilev's description of *A. chinai*. Until evidence to the contrary is received *A. chinai* will be deleted from the Australian faunal list.

Brachyrhynchus Laporte, 1832

Brachyrhynchus Laporte, 1832: 54 (descr.); Kormilev & Froeschner, 1987: 113 (reinstatement; catalogue of spp).
Dusius Bergroth, 1894: 104.
Hammatoneurum Blöte, 1965: 27.
Daulocorisella Blöte, 1965: 28.
Mezira (*Zemira*) Kormilev, 1971: 31, 34 (descr. of subgenus; key to spp.).
Mezira (*Zimera*) Kormilev, 1980:328 (replacement name for preoccupied *Zemira*).

TYPE SPECIES. *Brachyrhynchus orientalis* Laporte, 1832 (=*Acanthia membranacea* Fabricius) by monotypy.

DISTRIBUTION (Fig. 9D). Africa, Madagascar and the Indo-Pacific region, south to eastern Aus-

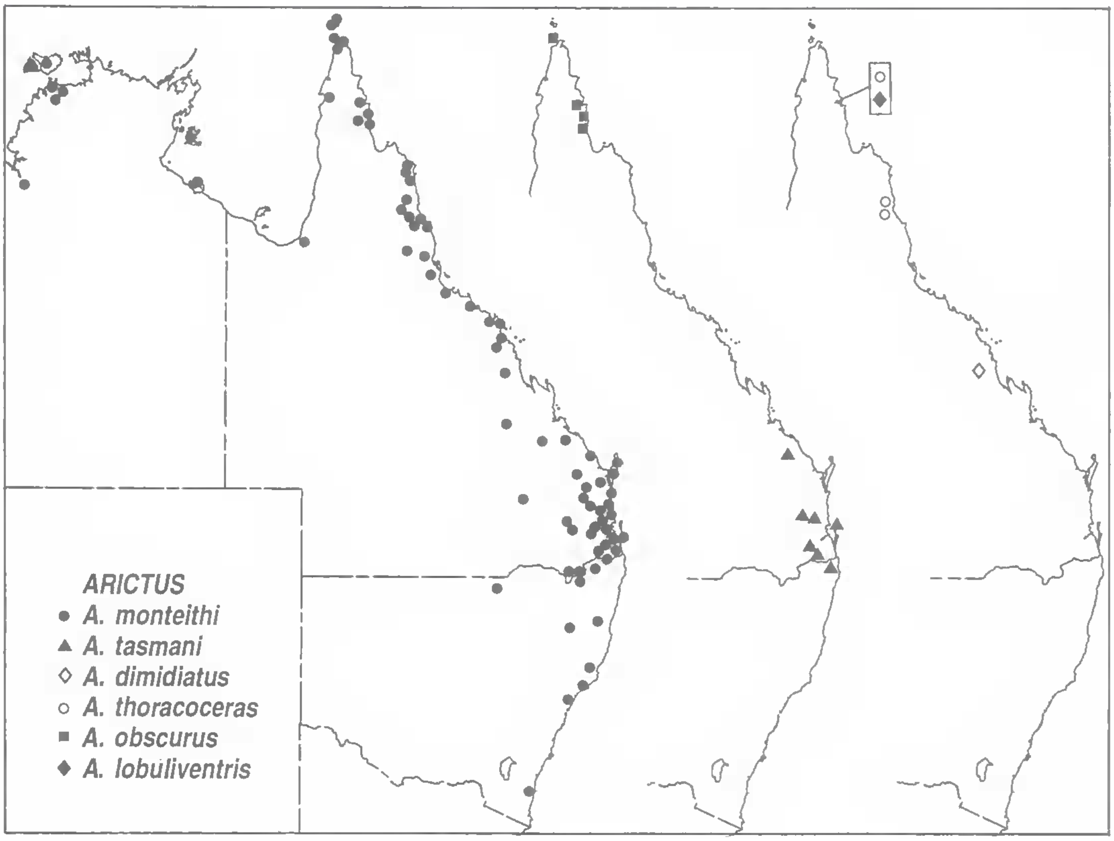

FIG. 35. Records of species of *Arictus* in Australia.

tralia and Tasmania, and east to the Society Islands but not New Zealand.

REMARKS. *Mezira* has been the largest and most difficult genus in the Aradidae. It has been a dumping ground for a great number of largish, winged Mezirinae which lacked distinguishing characters of other genera. The fact that '*Mezira*', in this sense, was undoubtedly composite has been recognized by many authors and despite the efforts of Usinger & Matsuda (1959) to split off several generic entities (e.g., *Oroessa, Daulocoris, Arictus, Chinessa*), '*Mezira*' has remained one of the outstanding taxonomic problems in the family. Usinger & Matsuda (1959) ascribed 106 species to '*Mezira*' and by 1987 this number had risen to more than 230 from every part of the globe (Kormilev & Froeschner, 1987).

The formidable task of reviewing the status of this group of species could only be undertaken on a world basis (Kormilev, 1971). Kormilev (1971) erected *Mezira* (*Zemira*) for the *membranacea*-group of species from the Oriental-Pacific region and later (Kormilev, 1974) included a group of African species with them. Later, Kormilev (1980) discovered that the subgeneric name was preoccupied and he replaced it with *Zimera*. Kormilev & Froeschner (1987) made the radical step of raising all subgenera to generic rank. In doing so they discovered that the long-rejected name, *Brachyrhynchus*, was available. Since both *Brachyrhynchus* and *Zimera* were based on the same type species, *Acanthia membranaceus* Fabricius, *Brachyrhynchus* is an objective senior synonym of *Zemira*. Kormilev (1971) had defined *Zemira* by its large tarsal claws without pulvilli and a deep sinuation in the hind pronotal border. These criteria had not been applied across all the existing species of '*Mezira*', so many of the species still remaining in *Mezira* s. s. were there by default only, pending examination of authentic specimens. This definition was not elaborated upon by Kormilev & Froeschner (1987) when they raised *Brachyrhynchus* and *Mezira* to generic rank, and hence many species were rather abitrarily allocated to the genera when it came time for cataloguing them.

Five Australian species belong to '*Mezira*' in the sense of Usinger & Matsuda. Kormilev included only *sulcatus* and *subtriangulus* in his key to *Zemira* Kormilev, 1971: 31), implying that he considered *australis*, *wilsoni* and *elegans* to be members of *Mezira* s. s.. Kormilev & Froeschner (1987) listed *australis*, *elegans*, *sulcatus* and *subtriangulus* under *Brachyrhynchus*, while *wilsoni*, a very close relative of *australis*, is alone placed in *Mezira*. However, all 5 Australian species lack tarsal pulvilli and have the pronotal border moderately excavated, according with Kormilev's original definition of *Zemira* (=*Zimera*, =*Brachyrhynchus*). Since this present work deals with only a minor component of the vast *Mezira-Brachyrhynchus* complex it is not appropriate here to consider the problem of the respective status of these taxa. I deal with them all under *Brachrhynchus*.

Of the 5 Australian species 2 are widespread open forest endemics (*australis*, *wilsoni*), 2 are rainforest species shared with New Guinea (*sulcatus*, *subtriangulus*), and the fifth (*elegans*) is known from a unique specimen of uncertain vegetational affinities.

Australian species for which ♂ are available have parameres with a distinctive ridge of fine teeth on the inner face (Figs 37I-L). This is not seen in any other winged genus in Australia but is present throughout the complex of fully apterous genera in Australia, New Caledonia and New Zealand. As discussed elsewhere this is believed to support the contention that the macropterous ancestors of this large apterous complex lie in the *Brachyrhynchus-Mezira* complex.

KEY TO AUSTRALIAN SPECIES OF *BRACHYRHYNCHUS*

1. Wing membranes with branching venation clearly evident; sides of pronotum indented on each side at junction between fore and hind lobes 2
 Wing membranes without branching venation evident; sides of pronotum straight or uniformly curved, not indented 3

2(1). Veins of wing membranes glabrous; transverse sulcus between fore and hind lobes of pronotum very deep; hind pronotal lobe with an irregular tubercle on each side of anterior declivity; ♂ with margins of Cx VII biconvex . . . . *sulcatus* (Kormilev)
 Veins of wing membranes setose; transverse sulcus of pronotum shallow, anterior declivity of hind pronotal lobe without large tubercles; ♂ with margins of Cx VII simply rounded . . . . *subtriangulus* (Kormilev)

3(1). Submedian areas of pronotal fore lobe with a glabrous disc set on an elevation on each side of midline; female paratergites of VIII shorter than length of midline of VIII; broad species with head-body length 2.25 or less times body width . . 4
 Submedian areas of pronotal fore lobe barely differentiated; female with paratergites of VIII large, longer than median length of Tg VIII; small, slender species with length 2.5 times width . . . . *elegans* (Kormilev)

4(3). Pronotal fore lobe with submedian elevations much higher than sublateral elevations and with anterolateral angles produced, usually beyond level of collar; lateral margins of pronotum convex; male paramere with tooth at base of posterior margin bent outwards . *wilsoni* (Kormilev)
 Pronotal fore lobe with submedian and sublateral areas of equal height and with anterolateral angles reduced, not surpassing collar; lateral margins of pronotum straight; ♂ paramere with tooth at base straight, in line with posterior margin . . . . *australis* (Walker)

Brachyrhynchus sulcatus (Kormilev, 1958) (Figs 5O, 37A,E,H,J)

Mezira sulcata Kormilev, 1958: 91 (descr.); Kormilev, 1965a: 33 (locality records); Kormilev, 1967a: 546 (locality records); Kormilev, 1968: 231 (locality records).
Mezira (Zemira) sulcata: Kormilev, 1971: 32, 40 (incl. in key; locality records).
Brachyrhynchus sulcatus: Kormilev & Froeschner, 1987: 119 (listed).

TYPE. Holotype ♂, Australia N.S.Wales, in HNHM. Not examined but specimens compared with holotype on my behalf by Dr T. Vásárhelyi.

MATERIAL EXAMINED. 261 specimens: NEW GUINEA: Popondetta; Brown River, via Port Moresby, in QM. NORTH QUEENSLAND: Lockerbie, Cape York, in ANIC; 3km E of Lockerbie; Bamaga; Andoom, via Weipa; Iron Range; West Claudie R., in QM; Rocky River, via Coen, in AM; Shipton's Flat, via Helenvale, in ANIC and QM; Cooper Ck, Cape Tribulation, in ANIC; Upper Daintree River; Mossman Gorge, in QM; Redlynch, in BMNH; Cairns; Gordonvale; Upper Mulgrave River; Maalan, in QM; Yarrabah; Gadgarra, Bailey's Creek; Kolbo, in QDPI; Innisfail; Eubenangee; Kuranda, in AM. SOUTH QUEENSLAND: Brooloo SF, S. of Gympie, in AM; Bulburin SF; Mount Bauple; North Pine River, in QM; Pine River, in QDPI; Queensland (unlocalized), in BMNH. (QM duplicates lodged in DJ, SAM, EH, UQIC).

DISTRIBUTION (Fig. 38). Common, subcortical, rainforest species in New Guinea and along the eastern seaboard of Australia from the tip of

Cape York to S Queensland. The type series is labelled 'N.S.Wales' but no modern material is available to authenticate its occurrence south of the Queensland border. There is a large gap in collecting records between Innisfail and Bulburin.

REMARKS. This species is recognizable by its strong elevations on the pronotal fore lobe and the deep sulcus between forelobe and hind lobe. It is common in north Queensland but rare in the south. Old and modern records from the southern limit of its range are from the Pine River, north of Brisbane, and the great destruction of the fringing gallery rainforest there in recent years places its present status in doubt.

Brachyrhynchus subtriangulus (Kormilev, 1953) (Fig. 37C,F,G,I)

Mezira membranacea triangula: Kormilev, 1953: 339 (misidentification).
Mezira subtriangula Kormilev, 1957c: 269 (descr.); Usinger & Matsuda, 1959: 379 (listed); Kormilev, 1967a: 546 (locality records); Kormilev, 1967c: 300 (locality records).
Mezira (*Zemira*) *subtriangula*: Kormilev, 1971: 34, 46 (incl. in key; locality records).
Brachyrhynchus subtriangulus: Kormilev & Froeschner, 1987: 119 (listed).

TYPE. Holotype ♂, New Guinea, Huon Gulf, Simbang, 1898, Biro, in HNHM. Not examined.

MATERIAL EXAMINED. 40 specimens: NORTH QUEENSLAND: Lockerbie, Cape York, 2♂ 2♀, 6-10.vi.1969, GBM, 2♂ 1♀, 10-15,vi.1969, GBM, 2♂, 13-27.iv.1973, GBM; 3km E of Lockerbie, 1♂, 16-20.ix.1974, GBM; Iron Range, 5♂ 3♀, 30.iv.-4.vii.1977, GBM, 3♂ 1♀, 1-9.vi.1971, GBM, 2♂ 1♀, 5-10.v.1968, GBM, 2♂ 2♀, 28.iv.-4.v.1968, GBM, 1♀, 11-17.v.1968, 1♀, 27-30.iv.1973, GBM; Leo Creek road, 500 m, McIlwraith Range, 5♂ 3♀, 29.vi.-4.vii.1976, GBM & SRM, in QM; McIlwraith Range, NE of Coen, 1♂, 29.vi.-5.vii.1976, J. Donaldson, in QDPI. (QM duplicate lodged in EH, UQIC).

DISTRIBUTION (Fig. 38). Confined to rainforests of the northern half of Cape York Peninsula. Widespread and common in New Guinea, the Bismarck Archipelago, the Solomon Islands, Vanuatu and Micronesia.

REMARKS. *Brachyrhynchus subtriangulus* is a member of a difficult complex of large species related to *B. membranaceus* (Fabricius, 1803) and which occur from Asia through the islands of the Indo-Pacific. Kormilev (1957c) first began to split the group into discrete species and he continued in 1971 when he erected *B.* (*Zemira*) to contain them and provided a key to species. In the eastern part of its range this group is represented by *B. subtriangulus*, *B. solomonensis* (Kormilev, 1971), *B. micronesicus* (Esaki & Matsuda, 1951) and *B. funebrus* (Kormilev, 1971) but *subtriangulus* is the only member to reach Australia. This is the first record of the species from the continent.

Brachyrhynchus elegans (Kormilev, 1967) (Figs 36, 37D)

Mezira elegans Kormilev, 1967: 543 (descr.).
Brachyrhynchus elegans: Kormilev & Froeschner, 1987: 125 (listed).

TYPE. Holotype ♀, Dorrigo, N.S.Wales, W. Heron, in SAM 120,393. Examined.

MATERIAL AND DISTRIBUTION (Fig. 38). Holotype only known.

REMARKS. The status of this species remains doubtful in the absence of additional material to confirm the authenticity of the label locality of the unique holotype. Kormilev, when describing the species expressed some doubts when he wrote '*this new species looks more like a Neotropical Mezira than an Australian species, however the hind border of pronotum is more deeply sinuate than in the Neotropical species*'. Nevertheless the failure of more material of this apparently subcortical species to be recollected from the well known locality of Dorrigo, together with its non-Australian facies, favours the suspicion that the holotype is a mislabelled exotic.

Brachyrhynchus australis (Walker, 1873) (Figs 3A-D, 5P, 37K)

Crimia australis Walker, 1873: 22 (descr.); Lethierry & Severin, 1896: 47 (listed).
Brachyrhynchus scrupulosus Bergroth, 1886: 56 (descr.); Lethierry & Severin, 1896: 43 (listed); Kormilev & Froeschner, 1987: 119 (listed) *syn. nov.*
Brachyrhynchus australis: Distant, 1902: 362 (listed); Kormilev & Froeschner, 1987: 114 (listed).
Mezira australis: Usinger & Matsuda, 1959: 379 (listed); Kormilev, 1965a: 33 (locality records); Kormilev, 1965b: 6 (locality records); Blöte, 1965: 34 (locality records); Kormilev, 1967a: 542 (locality records); Kumar, 1967 (internal anatomy).

TYPES.
Crimia australis: Lectotype ♀, N. Holl., Ent. Club. 44-12, in BMNH. Examined.

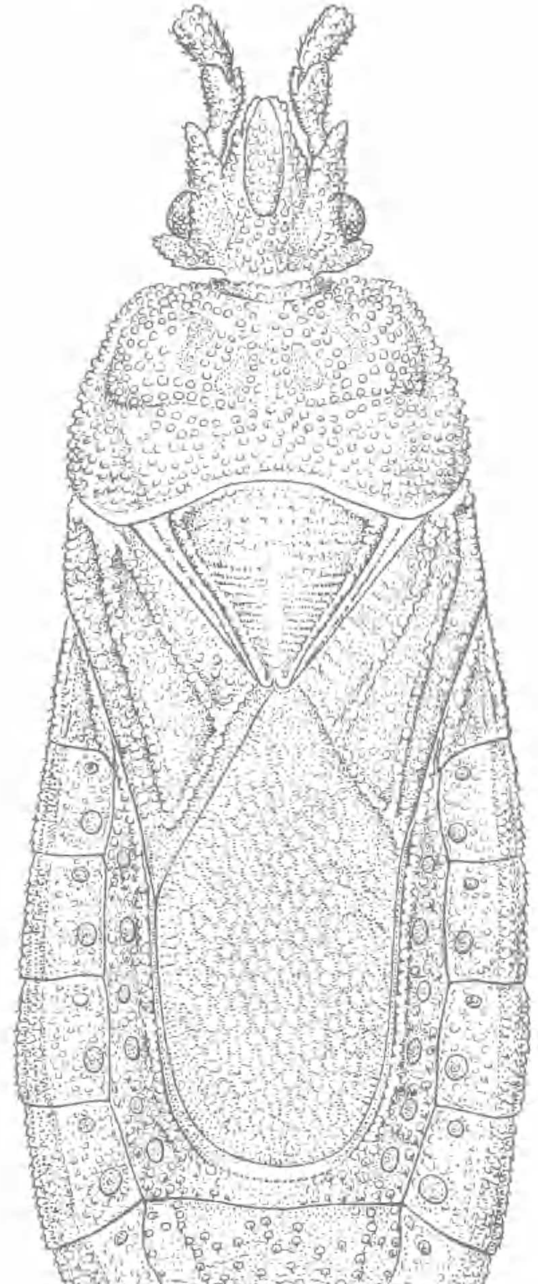

FIG. 36. Dorsal view of holotype of *Brachyrhynchus elegans*.

Brachyrhynchus scrupulosus: Holotype ♀, Nov. Holl., Schultz, 7269, in HUB. Examined.

LECTOTYPE. Walker (1873) listed 3 specimens as follows: '*a. Australia. Presented by the Entomological Club. b. South Australia. Presented by R. Bakewell, Esq. c. Queensland*'. All 3 specimens are preserved in the British Museum and they represent 3 different species. Specimen 'a' is a ♀ of the species which has been widely known as *australis* in modern times (Kormilev, 1965a, 1965b, 1967a; Kumar, 1967) and is here designated the *lectotype*. The specimen is stage mounted and is in good condition except for the loss of the right middle leg, the tibia of the left middle leg, the apical segment of the left antenna and the two apical segments of the right antenna. It now bears 5 labels as follows: (1) handwritten, pencil, white 'N. Holl.', (2) printed, white 'Ent. Club. 44-12', (3) printed, white '*Crimia australis* Walker's Catal.', (4) red, handwritten 'LECTOTYPE, *Crimia australis* Walker, 1873', (5) white, printed '*Mezira australis* (Walker, 1873) Det. G.B. Monteith, 1978'. Specimen 'b' is a ♀ of *B. wilsoni* Kormilev. It bears a circular, green-edged label reading 'Type' but, according to advice from Mr W. Dolling of the British Museum, such labels on Walker material have no nomenclatural status. Accordingly this specimen has been labelled as a *Syntype* of *Crimia australis* Walker but now bears my determination label as *Mezira wilsoni*. Specimen 'c' is a ♀ of *Neuroctenus grandis* Kormilev and now bears a *Syntype* label as *Crimia australis* and my determination label as *Neuroctenus grandis*.

SYNONYMY OF *Brachyrhynchus scrupulosus*. Bergroth's description of *scrupulosus* refers only to the ♀ and gives the following details on material studied: 'Patria: Australia (D. Schultz). Mus. Berol. Var. b. Minor, totus niger. Lon. ♀ 7½ - 8 mm. Patria: Nova Caledonia - Coll. Sign.' I have taken the single specimen in the collection of the Humboldt University of Berlin as the holotype and it agrees well with the Lectotype of Walker's species selected above. I have not located the New Caledonian specimen mentioned by Bergroth but since it is referred to as 'Var b' it cannot qualify as of syntypic status under Article 72b of the ICZN. Kormilev & Froeschner (1987) erroneously listed 'New Guinea' instead of New Caledonia for type material of this species.

MATERIAL EXAMINED. The types and 296 specimens: NORTHERN TERRITORY: Stapleton, in SAM & BMNH; Black Point, Cobourg Pen.: 9km NE of

Mudginberri HS; Gove; Horn Islet, Pellew Group, in QM; 12km NNE Borroloola, in ANIC; W. Alligator R. mouth, in QM. NORTH QUEENSLAND: Hann River Xing, in ANIC; Mt Isa; Karumba; 26km W Mareeba; 6 ml. W. of Kuranda; 50 ml. S. of Hughenden; '40-Mile Scrub', via Mt Garnet; Walkamin; 7.7km W Greenvale, in QM. CENTRAL QUEENSLAND: Greta Ck., 20 ml N of Proserpine; Mt Etna, Rockhampton in QM; Clermont, in AM. SOUTH QUEENSLAND: Coringa Scrub, Central Burnett; Rosedale; Pomona; Taroom; Inglewood; Broadwater, in QDPI; Fletcher in ANIC; Mt Moffatt NP, The Tombs; Mt Moffatt NP, Consuelo Tbld; Womblebank, via Injune, in QM; Morven; Cunnamulla; Condamine; Carnarvon Gorge; Blackall; St. George, in AM; Millmerran; Condamine; Cunnamulla; Bybera Road, Inglewood; Chinchilla; Glenmorgan; 16km N Boonah; Mt Crosby, in QM and in UQIC; Braemar SF, via Kogan; Lake Broadwater (SW Track); Lake Broadwater (Site 9); Warwick; Dunwich, Stradbroke Island; Meandarra; Brisbane, in QM; Ravensbourne; Bunya Mts; Mt Tamborine; Nundubbemere Falls, 25km SW Stanthorpe, in QM; 16 km S Texas, in ANIC; Fletcher, in BCRI. NEW SOUTH WALES: 10 ml W of Glen Innes; 30 ml. W of Junee, in QM; Nyngan dist.; Wellington; Coolabah, in ANIC; Bogan River; Wheogo, nr. Dunedoo; Nyngan; Howlong; Barrington Tops; nr. Tottenham; Burning Mt., Wingen; Tenterfield; Nandewar Range, nr. Narrabri, 6km SE of Mt Harris; Weetaliba; 38km N. of Bourke, in AM; Ponto Falls, nr Wellington, in QM; Branxton; Wellington; Howlong; Sandy Hollow, 30km W Muswellbrook, in BCRI; Sydney; N.S.Wales, in BMNH. AUSTRALIAN CAPITAL TERRITORY: Canberra, in ANIC. SOUTH AUSTRALIA: Parachilna, Flinders Ranges, in QM; Mt Remarkable, in SAM. (QM duplicates lodged in DJ, EH, NMNH, HNHM).

DESCRIPTION (based on Lectotype and additional modern material). Medium sized, oval, 7.50-9.00mm long, with elevations of pronotal fore lobe low.

MALE. Head length subequal to width across eyes; vertex with crowded, low granules not in rows; supra-ocular carinae well developed, crenulate; postocular tubercles broad, with hind margins curved, reaching, or slightly surpassing outer profile of eyes; antenniferous tubercles with outer margins subparallel, their apices blunt, reaching to basal 1/3 of first antennal segment; genal processes reaching to 4/5 length of first antennal segment, with their apices blunt, notched and sometimes slightly divergent. Rostrum shorter than rostral groove which is open posteriorly. Antennal length 1.5-1.75 times head length; segment III longest; segments II and III apically crenulate.

Pronotum width 1.87-1.96 times median length; collar clearly separated off; lateral margins subparallel on posterior half and convergent, straight, on anterior half; anterolateral angles rounded, narrow, not produced anteriorly beyond level of collar; fore lobe with submedian areas each consisting of a low crescentic, obliquely placed glabrous callus surrounded by a single row of granules on inner margin and by 2-3 rows of granules on outer margin; sublateral areas forming a weakly inflated patch of granules; hind pronotal lobe bearing rather sparse surface granules; hind pronotal margin moderately concave in centre. Scutellum with width 1.18-1.32 times length; margins carinate, thickened at anterolateral angles; apex notched; disc granulate, wrinkled, with midline weakly elevated. Hemelytra reaching hind margin of Tg VI; coria reaching half length of Tg III, their surface granular; membranes black with surface opaque and roughened, venation not distinct.

Abdomen with margins gently curved, without any Cx angles protruding; outer half of dorsal Cx plates longitudinally striate, inner half punctate; Tg VII roundly elevated above pygophore; paratergites of VIII short, broad, apically rounded and with spiracle ventral, far from apex. Pygophore with base of dorsum impressed on each side of midline. Parameres as in Fig. 37K. Spiracles of segments II-VII present, situated ventrally, far from margin.

FEMALE. As for ♂ except: Tg VII with a quadrate elevation which is depressed in middle; paratergites of VIII short, broad, shorter than length of midline of Tg VIII; apex of segment IX surpassing apex of paratergites of VIII.

MEASUREMENTS. Lectotype of *australis* first, holotype of *scrupulosus* second, then ranges of 2♂ and ♀. L: 8.50, 9.00, 7.50-8.00, 7.83-9.00; W: 3.92, 4.17, 3.33-3.75, 3.67-4.08; HL: 1.30, 1.40, 1.26-1.32, 1.16-1.34; HW: 1.36, 1.40; 1.16-1.30, 1.26-1.28; PL: 1.54, 1.66, 1.30-1.40, 1.42-1.60; PW: 2.88, 3.16, 2.50-2.75, 2.75-3.08; SL: 1.30, 1.42, 1.14-1.36, 1.30-1.40; SW: 1.72, 1.86, 1.40-1.60, 1.54-1.80; WL: 4.58, 4.67, 3.83-4.42, 4.17-4.75; corium length: 2.40, 2.40, 2.06-2.20, 1.90-2.30; AS: I, 0.50, 0.54, 0.42-0.48, 0.44-0.50; II, 0.58, 0.58, 0.44-0.50, 0.50-0.56; III, 0.68-0.76, 0.58-0.60, 0.64-0.70; IV, absent, 0.50, 0.44-0.48, 0.46-0.48.

DISTRIBUTION (Fig. 38). Endemic, subcortical, open forest species with the widest distribution and the greatest tolerance of aridity of any Australian mezirine. Northern Territory to north Queensland and down eastern Australia to the

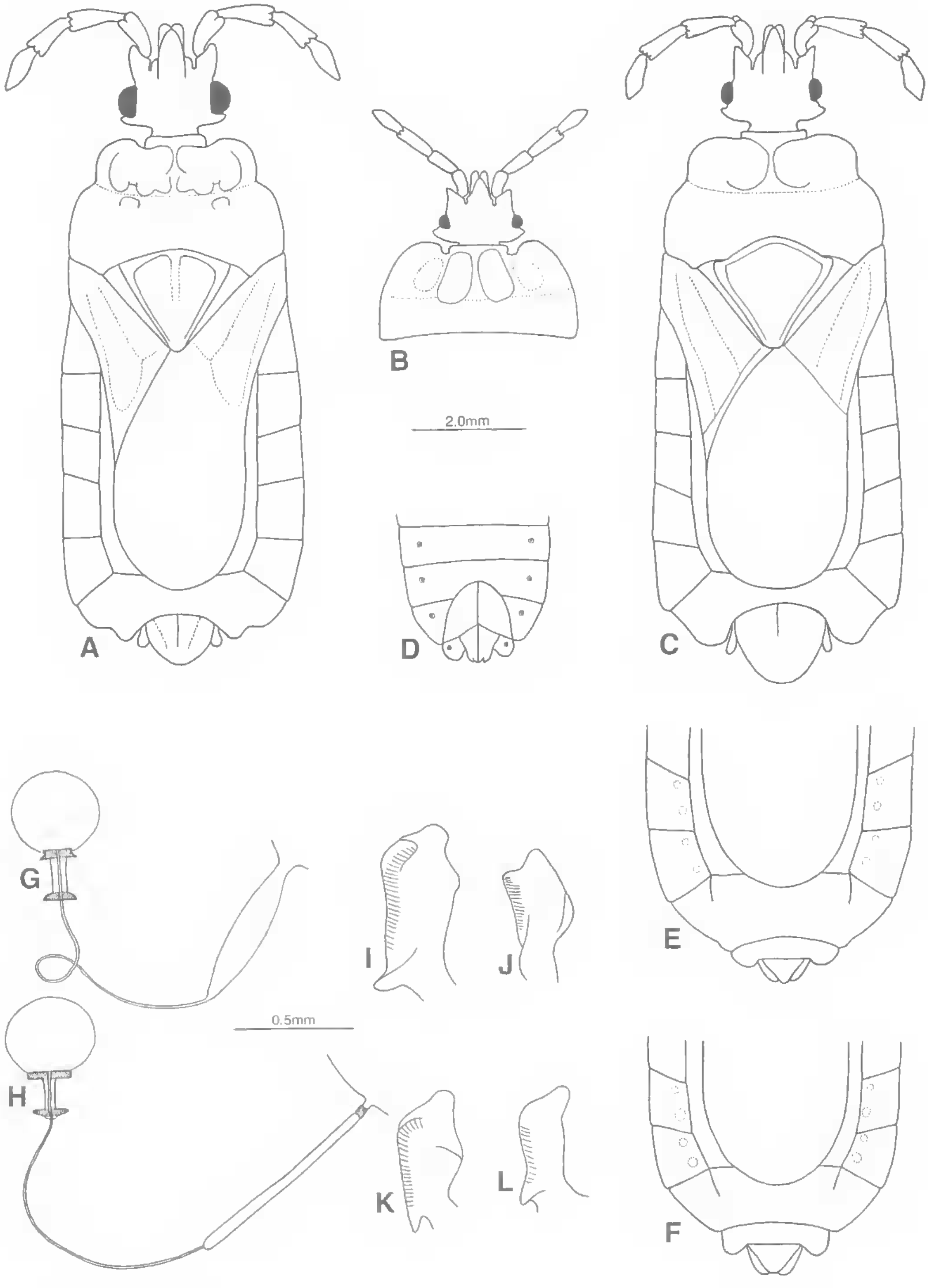

FIG. 37. *Brachyrhynchus* spp.; A, *B. sulcatus* ♂; B, *B. wilsoni*; C, *B. subtriangulus* ♂; D-F, ♀ abdominal apices; D, *B. elegans* ventral; E, *B. sulcatus* dorsal; F, *B. subtriangulus* dorsal; G-H, spermathecae; G, *B. subtriangulus*; H, *B. sulcatus*; I-L, left parameres, inner view; I, *B. subtriangulus*; J, *B. sulcatus*; K, *B. australis*; L, *B. wilsoni*.

A.C.T. and E South Australia. It has not been recorded from Victoria or from northern Cape York Peninsula.

REMARKS. This species is closely related to *B. wilsoni* and is broadly sympatric with it over much of eastern Australia.

Brachyrhynchus wilsoni (Kormilev, 1967) *comb.nov.* (Fig. 37B,L)

Mezira wilsoni Kormilev, 1967a: 542 (descr.); Kormilev & Froeschner, 1987: 160 (listed).

TYPE. Holotype ♂Lorne,,,,,,,,,V.27.x.1918F.EWilson, SAM I20,390.

MATERIAL EXAMINED. Holotype and 71 specimens: CENTRAL QUEENLAND: Springcliffe, via Mackay, 2♂ 3♀, 12.i.1965, E.J. Dunwoody, in QM; Rockhampton, 1♀, 15.x.1924, A. Musgrave, in AM. SOUTH QUEENSLAND: 20km E Kroombit Tops, 2♀, 28.vi.1989, JS, D. Potter, J. Chaseling; Samford, 1♀, 23.vi.1966, F.R. Wylie; Ravensbourne, 1♀, 15.ix.1971, BKC; North Pine River, 5♂ 1♀, 5.ix.1965, GBM; St Lucia, Brisbane, 2♂, 3.ii.1975, GIT, in QM; 2♀, 3.vii.1911, H. Hacker, in QM & BMNH; South Emu Creek, via Emu Vale, 1♀, 22.v.1969, BKC; Braemar SF, via Kogan, 1♂ 1♀, QM Berl 215, R. Raven, 1♀, QM Berl 218, 18.x.1979, GBM, 2♂ 4♀, 15-19.x.1979, GBM; Lake Broadwater, 5♂ 1♀, QM Berl 722 (Site 1), 22.ii.1986, V.E. Davies & GIT, 1♀, QM Berl 719 (Site 2), 24.ii.1986, V.E. Davies & GIT, in QM. NEW SOUTH WALES: Toorooka, Macleay R, 1♀, 10.i.1992, JS & J. Chaseling; 30 ml W of Junee, 4♂ 2♀, 5.iv.1969, GBM; South Ita Sand Hills, 70 ml. S of Broken Hill, 1♀, 8.xii.1966, J.B. Williams, in QM; Mt Jerrabombera, via Queanbeyan, 1♂, 14.xii.1969, I.C. Taplin, in ANIC; Jindabyne, allotype ♀ paratype ♀, 26.ii.1951, F.E. Wilson, in SAM; Island Bend, 4,100', Kosciusko, 2♀, 24.xi.1952, J.W.T. Armstrong, in AM. VICTORIA: 14km W of Murrayville, Berlesate 244, Roadside mallee, 2♀, 9.ii.1970, C. Brooks; 1km N of Nowingi, Berlesate 233, Roadside Mallee, 2♂, 8.ii.1970, C. Brooks; 11km E of Hattah Lakes, Berlesate 239, roadside mallee, 2♂, 6.ii.1970, C. Brooks; Chiltern Forest, Berlesate 14, leaf litter, 1♂, ii.1967, R.S. McInnes; 27km S of Ouyen, 1♀, 8.ii.1970, C. Brooks, in ANIC; Mt Cobberas, 1700 m, 1♀, 5.iv.1969, J. Sedlacek, in QM. TASMANIA: Mt Wellington, 1♂ 1♀, J.W. Evans, in QM; Glen Dhu, 1♂ 1♀, 3.viii.1929, V.V. Hickman, in AM; Launceston, 1♀, in BMNH; Hobart, 3♀, A.M.Lea, in TAD; 12 ml S Campbelltown, 1♂ 2♀, 3.v.1973, H.D.Baker & A. Dartnell, in TMAG. WESTERN AUSTRALIA: Walsh Point, Admiralty Gulf, ANIC Berl.871, 1♂, 16.v.1968, J. Balderson, in ANIC. (QM duplicates lodged in EH, UQIC).

DISTRIBUTION (Fig. 38). Open forest in Tasmania and on the mainland from Victoria to Mackay in Queensland. Most occurrences are from along the Great Dividing Range but there are records from the western plains of New South Wales and Victoria. One specimen is recorded from NW Australia.

REMARKS. *B. wilsoni* is easily recognized by the great enlargement of the submedian elevations of the pronotal forelobe, but in other respects it is very similar to *B. australis*. The two species overlap in range but *wilsoni* extends to higher elevations and is the only member of the Mezirinae to occur in the higher parts of the Australian Alps.

Many of the records of *B. wilsoni* are from leaf litter and debris at bases of eucalypt trees and in this situation it extends into semi-desert mallee regions.

Drakiessa Usinger & Matsuda, 1959

Drakiessa Usinger & Matsuda, 1959: 230 (descr.); Kormilev, 1965a: 25 (key to spp.); Kormilev, 1971: 6 (incl. in key); Kormilev & Froeschner, 1987: 136.

TYPE SPECIES. *Chelonoderus hackeri* Drake, 1942, by original designation.

DESCRIPTION. Moderate to large, heavily sclerotised, apterous.

Head broad and flattened, postocular tubercles usually well developed as triangular lobes; eyes small, exserted, separated from antenniferous tubercles by a deep cleft extending beyond inner margin of eye; antenniferous tubercles usually blunt; genal processes usually blunt and not fused basally beyond the apex of the clypeus; rostral groove almost always closed behind; rostral atrium closed. Antennae usually with all segments of similar diameter; two apical segments of subequal length.

Pronotum without median longitudinal groove; submedian areas not elevated and usually with distinct glabrous plates; sublateral elevations present; pronotal collar separated off by a dorsal groove and bearing both dorsal and ventral opposable tubercles; hind margin of pronotum with discrete border present in median region. Mesonotum and metanotum both with elevations. Thoracic opposable tubercles always present as follows: a pair present between mesonotal and metanotal elevations one each side of thorax; two pairs (anterior and posterior) present between metanotal elevations and median plate of abdominal Tg I. A deeply inflected cavity present between mesonotum and metanotum on each side of midline. Legs not bicoloured. Tarsal pulvilli present, spatulate.

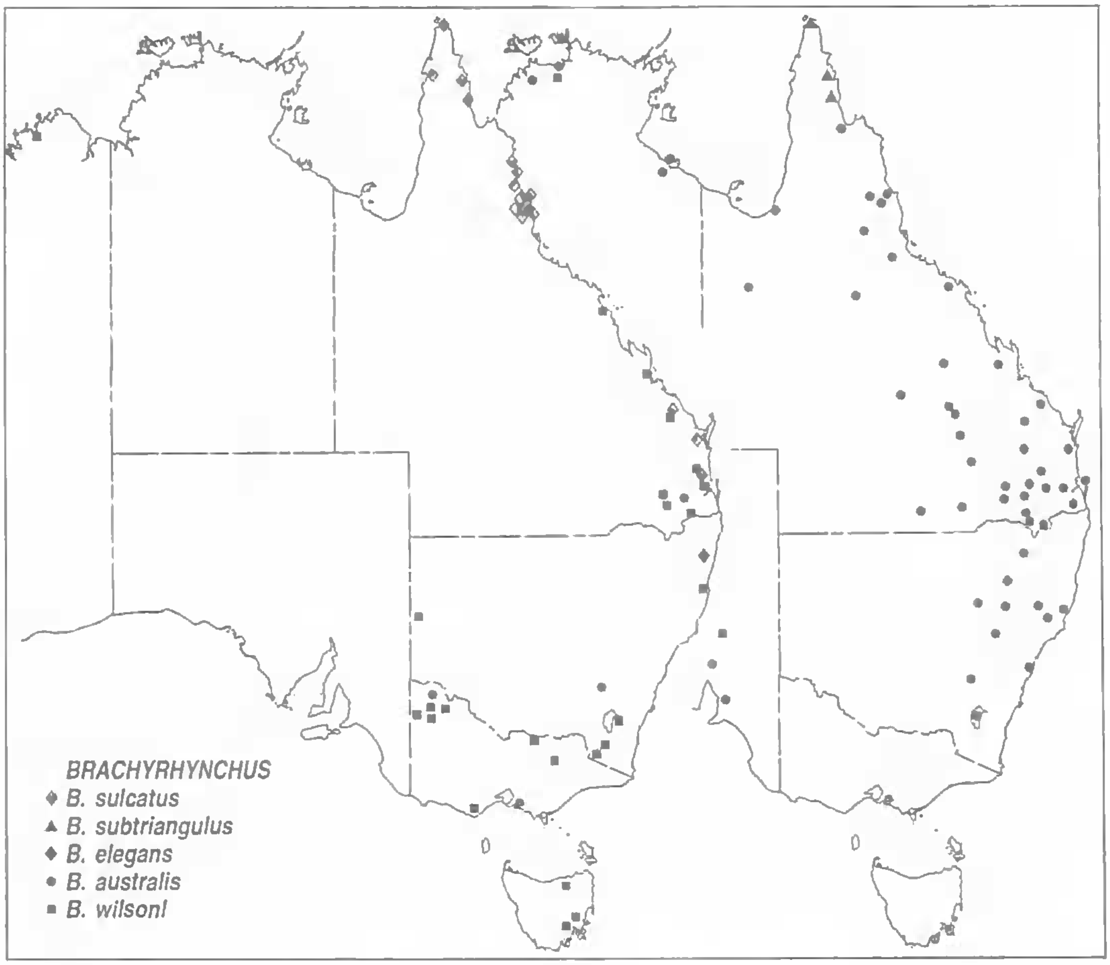

FIG. 38. Records of species of *Brachyrhynchus* in Australia.

Abdominal tergal disc usually not greatly elevated; its pattern of glabrous areas generally distinct and demarcated by raised ridges; inner glabrous areas of Tg II and III subdivided by ridges; suture between Tg I and II distinct in middle and obliterated laterally; small opposable tubercles present between posterior angles of central plate of Tg I and anterior margin of Tg II; lateral margins of Cx VII usually angled in ♂.

Meso- and metasterna with median impressions; pattern of glabrous areas deeply impressed on abdominal sterna.

Spermatheca and its duct without modifications, or with a dilation in the duct. Parameres with a row of fine teeth on inner face.

DISTRIBUTION (Fig. 10B). Australian endemic confined to the eastern seaboard between central Cape York Peninsula and northern N.S.W.

REMARKS. *Drakiessa* has 13 named and 1 unnamed species making it the largest genus of Aradidae in Australia. It comprises a group of large robust species separable from all other apterous Australian Mezirinae by the non-sulcate midline of the pronotum and the pattern of thoracic opposable tubercles. All species, except the rather anomalous type, *D. hackeri*, coat themselves with a heavy incrustation of soil and debris which must be cleaned off before identification. This is difficult to do with dried specimens because the body hairs are embedded in the dried soil layer. It is best done with a mounted needle and fine brush with the specimen in alcohol before mounting.

The genus has its centre of diversity in south Queensland where 7 species occur in a complex interwoven distribution pattern with up to 4 species being sympatric. The remaining species occur singly in rainforest tracts further north in Queensland with the exception of the major Cairns – Atherton Tableland system where *D. glaebula* and *D. planula* coexist and at Eungella where *D. sybilae* and *D. minor* coexist.

KEY TO THE SPECIES OF *DRAKIESSA*

1. Second and third antennal segments with erect setae as long as diameter of shaft of segment; genal processes apically pointed (except in *D. arelimira*) and with a lateral angulation 2
Second and third antennal segments with decumbent setae shorter than diameter of shaft of segment; genal processes apically rounded (except sometimes *D. wasselli*) and without a lateral angulation 4

2(1). Scutellar area convex and granular; sides of abdomen convex laterally . . . . . *virago*, sp. nov.
Scutellar area flat and smooth; sides of abdomen straight 3

3(2). Genal processes attenuate and apically pointed; margin of Cx VII straight on each side of pygophore . . . . *sybilae* sp.nov.
Genal processes apically blunt; margin of Cx VII angulate on each side of pygophore . . . . *arelimira* sp.nov.

4(1). Metathoraic scent gland orifice widely open, with prominent evaporative area visible in cleft; dorsal body surface with some sparse patches of erect setae, particularly on sublateral elevations of pronotum; abdominal spiracles raised on low tubercles; ♂ without polished boss on St VII . . 5
Metathoracic scent gland orifice narrow and slit-like; dorsal body surface without erect setae; abdominal spiracles not usually on low tubercles; ♂ with a polished boss on St VII (except *D. hackeri*) 7

5(4). Pronotum with a lateral explanate margin laterad of sublateral pronotal elevations . . . . *parva* Kormilev
Pronotum without lateral explanate margins laterad of sublateral pronotal elevations 6

6(5). Third and fourth antennal segments subequal in length and diameter; postero-lateral margin of Cx VI not angled in male . . . *cantrelli*, sp. nov.
Third antennal segment longer and thinner than fourth; postero-lateral margin of Cx VI angled in male . . . . *glaebula*, sp. nov.

7(4). Most of head and body surface with dense, waxy, decumbent setae; postocular tubercles reduced to narrow bands behind eyes; male without median, polished boss on St (VII; size large, 11mm or more in length . . . . *hackeri* (Drake)
Head and body surface with sparse, inconspicuous setae; postocular tubercles forming angular processes behind eyes; male with a median, polished boss on St VII; size smaller, less than 11mm in length 8

8(7). Antenniferous tubercles and genal processes apically pointed; male with postero-lateral margin of Cx VI angulate (Cape York Peninsula) . . . . *wasselli*, sp. nov.
Antenniferous tubercles and genal processes apically blunt; male with margins of Cx VI straight . 9

9(8). Genal processes separate at base but with their apices bent towards each other and contiguous, thus enclosing a foramen between their bases; explanate lateral margin of pronotum terminating anterior to hind angles; female with median length of St VII longer than combined lengths of St V and VI . . . . *confusa* Kormilev
Genal processes parallel, their apices not bent towards each other; explanate lateral margin of pronotum continuous to hind angles; female with median length of St VII shorter than combined lengths of St V and VI 10

10(9). Polished boss on St VII on male in form of a small capitate tubercle with height equalling width (ca. 0.15mm); genal processes usually barely reaching apex of first antennal segment; head margin deeply incised behind posterior tubercles 11
Polished boss on St VII of male forming a broad, low disc about 0.5mm wide; genal processes slightly surpassing apex of first antennal segment; head margin sinuate, but not deeply incised, behind postocular tubercles 12

11(10). Genal processes contiguous in front of clypeus; narrower, body with length/width ratio of thorax and abdomen combined equalling 1.52-1.61 (South Queensland) . . . *minor* Kormilev
Genal processes slightly separated in front of clypeus; broader, body wider, with length/width ratio of thorax and abdomen combined equalling 1.41-1.46 (North Queensland) *planula*, sp. nov.

12(10). Polished boss on St VII of male bearing two small superimposed tubercles; female with hind margin of Tg VII straight for full width, making abdominal apex truncate . . . . *tertia* Kormilev
Polished boss on St VII of male flat, without superimposed tubercles; female with hind margin of Tg VII curved laterally so that abdominal apex is more rounded . . . . *consobrina*, sp. nov.

Drakiessa hackeri (Drake, 1942)
(Figs 2A, 40H, 43P,R,S, 44O,d)

Chelonoderus hackeri Drake, 1942: 190 (descr.).
Drakiessa hackeri: Usinger & Matsuda, 1959: 231; Kormilev, 1963: 446 (locality records); Kormilev, 1964: 47 (locality records); Kormilev, 1965a: 23 (locality records); Kormilev, 1967a: 523 (locality records); Kumar, 1967 (internal anatomy); Kormilev & Froeschner, 1987: 136 (listed).

TYPE. Holotype ♀, Montville, Australia, Jan., 1913. In NMNH. Type not examined but good condition verified for me by Dr R.C. Froeschner. The holotype, plus a paratype ♀ labelled 'Buderim Mountains, Australia, 6.iv.12, H. Hacker', are housed in the Drake Collection of Hemiptera, NMNH.

MATERIAL EXAMINED. 91 specimens: SOUTH QUEENSLAND: Gayndah, 2♀, Masters, in AM; Harry's Hut, Cooloola, 1♀, 4.v.1994, R.Sheridan; Cooran Tableland, via Gympie, 7♂, 4♀, 19-21.iii.1976, GBM; Jimna Range, via Kilcoy, 1♀, 9.xii.1966, GBM, 2♂ 2♀, 4.iv.1969, BKC; Yarraman, 1♂, 21.iv.1957; Imbil, 2♀, 6.xii.1966, GBM; Mt Beerwah, 1♂, 12.viii.1966; Buderim Mountain, 3♂ 1♀, 8.iv.1912, H. Hacker, in QM; Blackall Ranges, 3♂ 3♀, A.M. Lea, in SAM; Mt Glorious, 1♂, 24.ii.1987, A Hiller; Highvale, 1♀, 15.ix.1964; Mt Nebo, 1♀, 9.ix.1986, S. Wilson, 1♀, 3.ix.1966, H. Burton; Brookfield, 2♂, 10.iv.1964, 7♂ 5♀, 19.x.1964, GBM, in QM, 1♀, 19.x.1964, GBM, in ANIC; Ugly Gully, via Mt Crosby, 2♂ 2♀, 31.x.1964, GBM; Brisbane, 1♂, 18.iii.1984, G.Sarnes, 1♀, 3.vii.1911, H. Hacker, 1N, 7.ii.1925, H. Hacker, 1♀, viii.1963, B.A. Mooney, 1♂, 22-24.i.1975, GIT, 1♀, 3.ii.1975, GIT, 1♂, 1961, J.H. Bryan, in QM, 2♀, 2N, 8.viii.1959, R. Kleinschmidt, in QDPI; Tamborine Mtn., 2♂ 3♀ 1 N, 28.x.1912, H. Hacker, in QM, 1♀ 1N, A.M. Lea, in SAM, 1♀, 26.xi.1982, J. &. E. Doyen, in ANIC; National Park, 1♀, H. Hacker; Canungra, 1♀, 10.xii.1967, GBM, in QM; Tallebudgera Creek, 2♀, 11.x.1980, DJC, in UQIC. NEW SOUTH WALES: Rivertree, 1♀, E.Sutton, in BMNH; Whian Whian SF, via Dunoon, 700', 3♀, 25-26.xi.1972, GBM, in QM. NO LOCALITY: 1♂, 2♀, 6N, in QDPI; 1♀, in QM; 1♂, in SAM, 4♂ 3♀, in AM. (QM duplicates lodged in DJ, NMNH, MNMG).

DESCRIPTION. Very large, 11-15mm long, with dense vestiture of waxy, adpressed setae covering most of dorsal and ventral surfaces of head and body.

MALE. Head slightly longer than wide, its dorsum completely covered with waxy setae except for narrow glabrous strip on each side of vertex; postocular tubercles reduced to a narrow, angular strip behind each eye; eyes rather large, separated from antenniferous tubercles by a narrow cleft; antenniferous tubercles short, broad, apically blunt, extending beyond eyes by a little less than 2 eye diameters; genal processes with bases separate and apices contiguous enclosing a small foramen usually filled with detritus; lateral margins of genal processes each with a sub-apical angulation. Rostral groove closed posteriorly. Antennae shorter than head, with total length 0.8-0.9 head length; segment I longest, segment II shortest; segments III and IV subequal; setae on segments II and III short, adpressed.

Pronotum with anterolateral angles produced into rounded, semi-erect lobes terminating posteriorly before hind angles; sublateral elevations small, lower than upturned edges of lateral lobes; submedian areas with prominent glabrous discs laterad of median ridge terminating posteriorly as a slightly projecting median tubercle on hind pronotal margin; anterior to submedian areas pronotum slopes sharply forward to collar. Mesonotum with wing vestiges projecting laterally beyond body margin; scutellar area not raised; sublateral elevations of mesonotum larger than those of metanotum; metanotum largely glabrous laterad of median setose ridge. Metathoracic scent gland groove very narrow and semi-occluded.

Abdominal Tg I with central area raised and bearing two opposable tubercles on each side bearing against metanotal elevations; abdominal tergal disc raised along midline and with pattern of glabrous areas bolding marked by setose ridges; inner glabrous areas of Tg III-VI each subdivided into two by strongly elevated longitudinal ridges; sides of abdomen straight with margins of Cx II-VI a little sinuate; margin of Cx VII with a small projecting angulation; paratergites of VII very short, truncate, with spiracles apical. Mesosternum with a median sulcus. Pygophore deeply withdrawn inside segment VII, with a dorsal projection formed from apices of posterior parandria. Parameres as in Fig. 44O.

FEMALE. As for ♂ except: Tg VII with a pair of transverse posterior tubercles; St VII with median length shorter than that of V and VI combined. Spermatheca with a secondary chamber developed in its short duct (Fig. 44D).

MEASUREMENTS. Ranges of 2♂ and 2♀. L: 10.83-12.13, 13.67-14.50; W: 5.00-5.83, 7.33-7.50; HL: 3.00-3.58, 3.83-3.92; HW: 2.83-3.42, 3.50-3.67; PL: 1.25-1.32, 1.42; PW: 3.42-4.25, 4.50-4.83; AS: I, 1.05-1.06, 1.10-1.22; II, 0.50-0.60, 0.60-0.64; III, 0.66-0.78, 0.76-0.86; IV, 0.64, 0.74, 0.78.

DISTRIBUTION (Fig. 45). Common in open eucalypt forests of lowlands and tablelands from near Gayndah in SE Queensland to near Lismore in N N.S.W.

REMARKS. This well known species was the second apterous aradid to be described from Australia and although it is the type species of the largest Australian genus, it shows a number of features unique in the Australian fauna. It is the largest member of the Aradidae on the continent and is the only apterous mezirine to have fully adapted to the non-rainforest environment in Australia. It has a fairly close association with 'ironbark' eucalypts and may be found in large colonies on the underside of logs and under loose bark of dead stumps of this group of *Eucalyptus* species. The deep surface crevices and non-shedding characteristics of their bark provides a continuous cortical environment for a number of years after tree death and this enables several seasons of colony buildup of the aradid to occur after initial colony founding by this flightless species. *D. hackeri* has a surprisingly small geographic range considering the apparent lack of habitat constraints such as are seen in its rainforest relatives.

Within *Drakiessa* this species is strikingly distinct with its characteristic dense surface vestiture, its reduced postocular tubercles and its apparently functionless scent gland openings. Newly emerged specimens also show a surface bloom of waxy material not seen in other species. However, its basic thoracic structure is quite in accord with the generic pattern.

Drakiessa cantrelli sp. nov.
(Figs. 40B, 43I, 44e)

Drakiessa parva: Kormilev, 1967a: 523 (misident.).

TYPE. Holotype ♂, Whian Whian State Forest, 700', via Dunoon, New South Wales, 5.v.1973, I. Naumann, QMT11667.

MATERIAL EXAMINED. Holotype and 5 paratypes: SOUTH QUEENSLAND: Joalah NP, Mt Tamborine, 1♀, 18.vii.1969, BKC, 1♀, 12.iii.1990, J. Stanisic & D. Potter; Lamington NP, 1♀, 15.ix.1969, BKC, in QM. NEW SOUTH WALES: Mt Warning, in pitfall trap, 1♀, vi-xi.1976, GBM & SRM, in QM. (paratypes: QMT29709-29713).

DESCRIPTION. Medium-sized, 7.5-9.8mm long with tubercular thorax, reduced postocular tubercles and sparse, erect setae on dorsum.

MALE. Head slightly wider than long, its dorsum smooth, with tufts of erect setae at apices of antenniferous tubercles, postocular tubercles and genal processes; eyes small, strongly stylate, with small bluntly angulate postocular tubercles borne on stylate bases of eyes; cleft between eyes and antenniferous tubercles wide, the latter small, short, curving laterally, barely longer than stylate eyes, with blunt apices; 2 pairs of prominent opposable tubercles between antenniferous tubercles and median head process; genal processes narrow, slightly divergent, apically blunt. Antennae 1.15 times head length with adpressed setae on all segments; segment I longest, segment II shortest, segments III and IV subequal; all antennal segments subequal in diameter. Rostral groove closed behind.

Pronotum with long, erect setae with hooked apices on lateral and sublateral lobes; explanate lateral lobes reduced to flattened projections at anterolateral pronotal angles; sublateral elevations very large and overhanging posterior pronotal margin; anterior portion of sublateral elevations drawn out into hypertrophied opposable tubercles of collar. Mesonotum with scutellar area smooth and continuous with metanotum; lateral elevations of mesonotum large, smooth; wing vestiges forming small setose, lateral lobes; a very deep pit present between meso- and metanota on each side of middle; metanotal elevations large, smooth, with large opposable tubercles directed anterolaterally and posteromesally. Metathoracic scent gland openings widely open, curving above mid coxae, with extensive evaporative surface visible inside cleft. Legs with semi-erect setae on femora and tibiae.

Midline of abdominal Tg I prominently raised into a bilobed elevation; fused tergal disc with smooth, raised ridges separating glabrous areas; inner glabrous areas of Tg III, IV and V each subdivided into two by a ridge. Cx II very long and narrow; lateral margins of Cx II-VI straight, those of VII weakly angulate; Tg VII strongly inflated above pygophore. Paratergites of VIII short, truncate, with spiracles apical. Meso-, meta- and abdominal St with deep margin impression; pattern of glabrous areas deeply impressed on St and outlined by raised ridges; abdominal spiracles raised on low tubercles; St VII without polished boss.

FEMALE. As for ♂ except: abdominal tergal disc broadly inflated; Tg VII with a pair of tubercles Cx II shorter and broader; median length of St VII slightly longer than combined lengths of V and VI. Spermatheca with simple, short duct (Fig. 44e).

MEASUREMENTS. Holotype ♂ first, then range of two ♀. L: 7.50, 9.00-9.83; W: 3.42, 4.58-5.00; HL: 2.00, 2.28-2.44; HW: 2.16, 2.40-2.60; PL: 0.88, 1.08 - 1.20; PW: 2.44, 2.90-3.42; AS: I, 0.76, 0.84-0.86; II, 0.36, 0.44-0.46; III, 0.62, 0.70-0.72; IV, 0.56, 0.68-0.70.

DISTRIBUTION (Fig. 45). Rare in mountain rainforests on the plateau remnants of the Mt Warning shield volcano straddling the Queensland-N.S.W. border. The type locality is the only low elevation locality from which the species has been taken.

REMARKS. It is a pleasure to name this species for Bryan Cantrell, the collector of the first known specimens.

D. cantrelli forms, with the north Queensland *Drakiessa glaebula*, a closely related, disjunct species pair which have the most highly modified thoracic nota in the genus. Were it not for the intermediate species, *D. parva*, they could conveniently have been separated at generic level. The deep cavities, high tubercles and erect setae with hooked apices all seem to be modifications for holding the very thick layer of soil and debris with which they characteristically coat themselves.

Drakiessa glaebula sp. nov.
(Figs 39, 40L, 43M, 44K,V,h)

TYPE. Holotype ♂, Millaa Millaa Falls, N. Qld, 4.xii.1965, G.B. Monteith, QMT11668.

MATERIAL EXAMINED. Holotype and 14 paratypes: NORTH QUEENSLAND: Bellenden Ker Ra., 1♂ 1♀, 1.5km S. Cable Tower No 7, 500m, 17-24.x.1981, Earthwatch/QM, 1♂, 1km S. Cable Tower No. 6, 500m, 17-24.x.1981, Earthwatch/QM, 1♂, Cable Tower No. 3, 1054 m, 17.x - 5.xi.1981, Earthwatch/QM; Millaa Millaa Falls, 3♂ 4♀, 4.xii.1965, GBM, 2♀, 23.iv.1968, GBM; Palmerston NP, 1♂, 23.iv.1968, GBM; Vine Creek Rd, 1100m, 1♂, 24.xii.1994, GBM, in QM. (QM duplicates lodged in BMNH, EH) (paratypes: QMT14149-14151, QMT14153-14164, QMT22360).

DESCRIPTION. This species is very closely allied to *D. cantrelli*, and the description will be limited to a comparison with that species.

MALE. Antennae with segments II and III of slightly lesser diameter than that of segments I and IV; lateral margin of pronotum reduced to a narrow anterolateral projection; sublateral pronotal elevations smaller, less smooth; midline of hind pronotal margin with an opposable tubercle projecting backwards; mesonotal elevations smaller and more rugose than metanotal lobes; median elevation of abdominal Tg I higher and more strongly bilobate; abdominal tergal disc with a median, rounded scent gland scar tubercle; lateral margins of abdomen rather convex, not straight as in *cantrelli*; posterolateral angles of both Cx VI and VII angulate. Parameres as in Fig. 44V.

FEMALE. Differs from ♀ of *cantrelli* as follows: abdominal tergal disc more convex; sides of abdomen wider; size smaller. Spermatheca with short, simple duct (Fig. 44h).

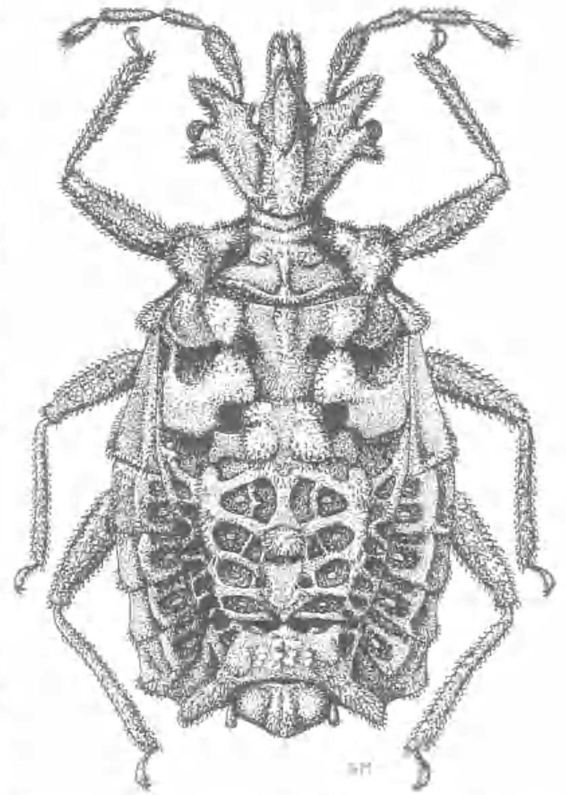

FIG. 39. Dorsal view of holotype ♂ of *Drakiessa glaebula*.

MEASUREMENTS. Holotype ♂ first, then ranges of additional 2♂ and 2♀. L: 7.50, 7.17-7.50, 8.17-8.33; W: 3.83, 3.75, 4.67-4.92; HL: 2.12, 2.00-2.20, 2.20-2.24; HW: 2.20, 2.20-2.28, 2.40-2.44; PL: 0.84, 0.84-0.88, 0.88-0.92; PW: 2.42, 2.32, 2.56; AS: I, 0.90, 0.88-0.96, 0.98-1.00; II, 0.46, 0.46-0.50, 0.50-0.52; III, 0.64, 0.56-0.62, 0.68-0.70; IV, 0.54, 0.50-0.54, 0.60.

DISTRIBUTION (Fig. 45). Wet mountain rainforests at the southern end of the Atherton Tableland and adjacent Bellenden Ker Range, N Queensland.

REMARKS. *D. glaebula* is little differentiated from *D. cantrelli*, despite their separation by about 1500km. Both species have been taken only in wet rainforests mostly on basaltic soils (except Bellenden Ker) which suggests that their disjunct distribution is probably real as there are few tracts of similar rainforest in the intervening region.

Drakiessa parva Kormilev, 1965
(Figs 40G, 43N-O, 44C,Q,j)

Drakiessa parva Kormilev, 1965a: 24 (descr.); Kormilev, 1967a: 523 (misident. of *Drakiessa cantrelli*); Kormilev & Froeschner, 1987: 136 (listed).

TYPE. Holotype ♀, Lamington Nat. Park, S.E. Qld., 22.v.1964, G. Monteith, QMT6327. Examined.

MATERIAL EXAMINED. Holotype and 26 specimens: SOUTH QUEENSLAND: Cunningham's Gap, 790m, 1♂, 1.iii-11.iv.1994, DJC; Binna Burra, 1♂ 3♀, 19.iv.1986, J.Stanisic; Lamington NP, 1♀ holotype, 1♂ allotype, 2♂ 1♀ paratypes, 17.viii.1965, GBM, 1♂ 1♀, 20.iii.1966, S. Hamlyn, 1♂, 17-24.v.1965, GBM, 1♂ 1♀, 17.viii.1965, GBM; Numinbah Arch, 25.iv.1974, GBM; Levers Plateau, via Rathdowney, 1♂, 3.iv.1965, GBM; Mt Clunie, 2000', 2♂ 1♀, 27.xi.1972, GBM; Mt Gipps, 750m, 1♂, 1.iv.1991, GBM; Upper Tallebudgera Ck., 600m, 1♂ 1♀, GBM & DJC, in QM. NEW SOUTH WALES: Wiangaree SF, 2♂, 14.v.1973, D. Crossman; Mt Glennie, via Woodenbong, 2♂ 1N, 3.xi.1983, GBM, in QM. (QM duplicates lodged in BMNH, EH, UQIC) (paratypes: QMT29714-29717).

DESCRIPTION. Medium-sized, 7-8.3mm long, with enlarged scent gland openings and continuous, explanate, pronotal margins.
MALE. Head with median length equalling width across eyes, its dorsum with sparse, semi-erect, curled setae on apices of ocular and genal processes and along midline; postocular tubercles wide, angular, reaching laterally to outer profile of eyes; eyes exserted, antenniferous tubercles broad, parallel-sided, apically subtruncate, reaching beyond eyes by about one eye diameter; opposable tubercles between antenniferous tubercles and median head processes small; genal processes long, widened apically, blunt, reaching just beyond apex of first antennal segment. Rostral groove closed behind. Antennal length 1.15-1.3 times head length, with all segments subequal in thickness; segment I longest, almost twice length of segment II; segments III and IV subequal; segments II and III with adpressed setae.

Pronotum width 2.7-3.0 times median length; lateral margins with explanate edges continuous almost to posterior angles; sublateral elevations large, their surfaces rugose, overhanging pronotal boarder posteriorly; each elevation curving mesally at front and subtending an opposable tubercle against the collar; posterior pronotal margin with a median, posteriorly directed opposable tubercle; mesonotum with metanotum with sublateral elevations smaller than those of pronotum and usually roughened and somewhat irregular in shape; scutellar area smooth and continuous posteriorly to raised central region of abdominal Tg I. Metathoracic scent gland orifice widely open with evaporative surface extending out of interior on to lips of cleft.

Abdominal tergal disc slightly inflated, with pattern of glabrous areas distinctly marked by raised, smooth ridges; inner glabrous areas of Tg III and IV each subdivided into two by a carina; sides of abdomen parallel, with edges of Cx II-VI straight; margin of Cx VII bluntly angulate; paratergites of VIII short, cylindrical, truncate with spiracles apical. Meso-, meta-, and abdominal St II-VI with deep median impressions; abdominal spiracles of segments II-VI raised on low tubercles; St VII without a raised, polished boss. Parameres as in Fig. 44Q.
FEMALE. As for ♂ except: sides of abdomen slightly convex; margin of Cx VII not angulate; Tg VII with quadrate elevation; median length of St VII longer than combined lengths of V and VI. Spermatheca with short, simple duct (Fig. 44j).

MEASUREMENTS. Holotype ♀ first, then ranges of additional two ♂ and two ♀. L: 8.00, 7.00-7.17, 8.00-8.33; W: 4.00, 3.16-3.25, 3.92-4.25; HL: 2.12, 1.80-1.92, 1.96-2.16; HW: 2.04, 1.96-2.00, 2.00-2.20; PL: 0.80, 0.80-0.88, 0.92; PW: 2.40, 2.48-2.80, 2.32-2.40; AS: I, 0.70, 0.74-0.76, 0.76; II, 0.36, 0.40, 0.42-0.44; III, 0.60, 0.60, 0.64; IV, 0.58, 0.60-0.62, 0.62-0.66.

DISTRIBUTION (Fig. 45). Wet mountain rainforests centred on the Lamington Plateau, SE Queensland with extensions along the Macpherson Range as far west as Cunningham's Gap and over the NSW border into the Tweed Ranges.

REMARKS. This species has the same pattern of thoracic tubercles as the *cantrelli-glaebula* species pair but lacks their specialisations of the head (extremely stylate eyes, reduced postocular tubercles). This places it as an intermediate form between the more generalized *tertia*-group and the divergent *cantrelli-glaebula* pair. *D. parva* is sympatric with both *cantrelli* and *tertia* on the Lamington Plateau.

Drakiessa consobrina sp. nov.
(Figs 5W,X, 40A, 43G, 44E,P,f)

Drakiessa tertia: Kormilev, 1965a: 24 (misident.).

TYPE. Holotype ♂, Bald Mountain area, 3-4,000', via Emu Vale, SE Qld., 17-22.v.1969, G.B. Monteith, QMT11669.

MATERIAL EXAMINED. Holotype and 77 paratypes: SOUTH QUEENSLAND: Ravensbourne, 3♀, 15.ix.1971, BKC; Toowoomba, pitfall trap, 1♀, GBM & SRM; Mt Mistake Plateau, via Goomburra, 1♀, 22.xi.1987, GBM; Bare Rock, 2km W Mt Cordeaux, 1100m, 2♂ 2♀, 20.ii.1994, GBM; Mt Huntley, 1250m, 2♂, 18-20.xi.1992, GBM; Bald Mountain area, 3-4000', 10♂ 7♀, 17-22.v.1969, GBM, 1♂, 17-22.v.1969, BKC, 1♂ 1♀, 16-20.v.1970, GBM, 1♀, 29.i.1973, I. Naumann, 1♀, 22-27.i.1971, GBM, 1♀, 22-27.i.1971, D. Murray, 3♂ 2♀, 27-31.i.1972, GBM, 2♂ 2♀ 27-31.i.1972, BKC, 1♀ pitfall trap, GBM & SRM; Mt Superbus summit, 1300m, 13♂ 2♀, 8-9.ii.1990, GBM, GIT & HJ, 1♂ 1♀, pitfalls, 18.ii-12.iv.1990, GBM, GIT & HJ; Mt Clunie, 2,000', 2♂ 1♀, 27.xi.1972, GBM; 'The Head', via Boonah, 2♂ 1♀, 18.i.1973, GBM, in QM. NEW SOUTH WALES: Mt Glennie, 16 km E. Woodenbong, 900m, 2♂ 2♀, 24.xi.1982, GBM, DKY & DJC; Acacia Plateau, via Legume, 1♀, 7.v.1973, I. Naumann; Tooloom Scrub, via Urbenville, 2♂ 1♀, 26-27.xii.1968, BKC, 1♀, 25.ii.1973, GBM; Bellbrook, via Kempsey, 1♀, 2.i.1967, GBM; Wilson River Reserve, via Wauchope, 1♂, 13.i.1986, GBM, in QM. (QM duplicates lodged in BMNH, DJ, SAM, EH, NMNH, HUB, HNHM, MNHG, UQIC) (paratypes: QMT29718-29781).

DESCRIPTION. Medium-sized, 7.7-9.5mm long, rugose, dark species with prominent pronotal margins and a smooth sternal boss in ♂.

MALE. Head width equal to or a little more than length, its dorsum with scattered, curled setae; about 6 large granules in 2 rows on vertex; postocular tubercles large, angular, extending beyond outer profile of eyes; eyes moderately exserted, with a deep, narrow cleft between them and antenniferous tubercles; the latter broad, blunt, short, surpassing eyes by about 1½ eye diameters; genal processes long, often not contiguous, with apices swollen and rounded. Rostral groove closed posteriorly. Antennae with length 1.1-1.2 times head length; segment I longest, segment II shortest, segment III slightly longer than IV, segments II and III with adpressed setae.

Pronotum about 3 times as wide as long, its surface rough, with scattered setae; margins explanate, produced anteriorly as flattened, rounded lobes; sublateral elevations small, irregular, situated posteriorly and separated from the tubercle opposable against the collar; middle of posterior pronotal margin developed as an opposable tubercle subtended against a tubercle of the scutellar region of the mesonotum. Mesonotal elevations low, coarsely granular; scutellar region setose; metanotal elevations small, each with prominent anterior and posterior opposable tubercles. Metathoracic scent gland orifice forming a curved, narrowly open slit.

Abdominal Tg I with a quadrate elevation medially; abdominal tergal disc flat, with pattern of glabrous areas delineated by low, rugose, setose ridges; inner glabrous area of Tg III each subdivided into 3 by two longitudinal ridges; inner glabrous areas of IV divided by one ridge; mesal margins of Cx II carinate on posterior half; Cx III with a short, median, longitudinal carina; sides of abdomen straight, widening somewhat posteriorly; Cx VII with margins bluntly angulate; paratergites of VIII short, rounded apically, with spiracles subapically ventral. St VII with a raised, smooth boss about 0.5mm in diameter on midline immediately behind anterior margin. Parameres as in Fig. 44P.

FEMALE. As for ♂ except: raised carinae along full length of inner margin of Cx II and medially on Cx III-VI; Tg VII median length less than that of V and VI combined. Spermatheca (Fig. f) with a small dilation and a long sclerotised region in the duct.

MEASUREMENTS. Holotype ♂ first, then ranges of additional 2♂ and 2♀. L: 8.17, 7.67-8.00, 9.00-9.50; W: 4.00, 3.75, 4.67-5.08; HL: 2.00, 1.96-2.00, 2.12-2.36; HW: 2.16, 1.96-2.00, 2.20-2.44; PL: 0.92, 0.92, 1.00-1.12; PW: 2.80, 2.60, 3.00-3.58; AS: I, 0.76, 0.70, 0.70-0.80; II, 0.40, 0.36-0.40, 0.40-0.44; III, 0.64, 0.56-0.60, 0.60; IV, 0.60, 0.54-0.56, 0.50-0.58.

DISTRIBUTION (Fig. 45). Mountain rainforests of the Great Dividing Range from west of Kempsey, N.S.W. to a little north of Toowoomba in Queensland. Strictly allopatric with respect to *D. tertia*, which occurs nearer the coast. The specimen from Cunningham's Gap referred to as *D. tertia* by Kormilev (1965a) is actually *D. consobrina*.

REMARKS. *D. consobrina* belongs to a group of 5 closely allied species (viz. *consobrina*, *tertia*, *minor*, *planula* and *confusa*). With the exception of *planula* all occur in SE Queensland where they show a complex pattern of distribution with *tertia*, *minor* and *confusa* mutually sympatric over part of their range. *D. consobrina*, however, is isolated from all the others. It occupies a latitudinal range of over 400km but is relatively uniform throughout.

Drakiessa tertia Kormilev, 1964
(Figs 40F, 43A,F, 44G,N,R,c)

Drakiessa tertia Kormilev, 1964: 47 (descr., fig.); Kormilev, 1965a: 24 (descr. of ♂; locality records);

Kumar, 1967 (internal anatomy); Kormilev & Froeschner, 1987: 169 (listed).

TYPE. Holotype ♀, Lamington National Park, Qld., 14-20.ii.1958, I.C. Yeo, QMT6211. Examined.

MATERIAL EXAMINED. Holotype and 58 specimens: SOUTH QUEENSLAND: Cooran Tableland, 400m, 1♀, 12.iv.1995, GIT; Kenilworth SF, 1♀, 1.iv.1969, BKC; Mt Mee SF, 1♀, 7.iv.1974, GBM; Highvale, 1♀, 15.ix.1964, GBM; Mt Glorious, 11♂ 6♀, 9.i.1972, GBM, 4♂, 31.x.1971, GBM, 1♂, 1.iii.1968, 1♀, 23.iii.1968; Lamington NP, 13♂ 4♀, 17-24.v.1965, GBM, 1♂ 1♀, 12.iv.1964, GBM, 1♀, 6.iii.1965, BKC, 1♂, 6.iii.1965, TAW, 1♀, 2.i.1973, I. Naumann; Mt Gipps, 750m, 1♀, 1.iv.1991, GBM, in QM, 1♀, 20.v.1965, GBM, in ANIC, 1♂ 1♀, 17-24.v.1965, GBM, in QDPI; Springbrook, ANIC Berl. No. 155, 1♂, 6.xi.1969, S. Misko, in ANIC. NEW SOUTH WALES: Wiangaree SF, via Kyogle, 1♀, 28.xi.1970, GBM; Whian Whian SF, via Dunoon, 700', 2♂ 1♀ 2N, 25-26.xi.1972, GBM, in QM. (QM duplicates lodged in BMNH, DJ, SAM, EH, NMNH, NRS, UQIC).

DESCRIPTION. Large, 8-10.2mm long, flattened, with truncate abdominal apex and 2 tubercles on sternal boss of ♂.

MALE. Head about as wide as long, most of its dorsum with short curled setae; a large granule on each side of occiput; postocular tubercles broad and angular, reaching outer profile of eyes; eyes exserted; antenniferous tubercles short, broad, blunt, reaching beyond eyes by a little less than 2 eye diameters; genal processes usually separated, with swollen, rounded apices slightly surpassing apex of first antennal segment. Rostral groove closed posteriorly. Antennae short, about 1.1 times head length; first segment longest, about twice length of II; segment III a little longer than IV; segments II and III with adpressed setae.

Pronotum width about 3.3-3.3 times median length; explanate lateral margins well developed, rounded, reaching beyond collar anteriorly and back to posterior angles; sublateral elevations small, consisting of a cluster of irregular tubercles on each side and separated from opposable tubercles subtended against collar; hind pronotal margin straight, with a small median, posteriorly directed tubercle opposable against a tubercle of the mesonotal scutellar area; sublateral elevations of mesonotum low, irregularly rugose. Metathoracic scent gland orifice long, narrowly open.

Abdominal tergal disc flat except for slightly raised, median, longitudinal scent gland scar; pattern of glabrous areas marked by setose ridges; inner glabrous areas of Tg III subdivided by two longitudinal ridges, those of Tg IV and V subdivided by one ridge; mesal margin of Cx II carinate; Cx III-VI each with a low median carina; outer margin of Cx III-V slightly concave, those of VII weakly angulate; paratergites of VIII short, cylindrical, truncate, with spiracles apical. St VII with a median, polished boss bearing two tubercles situated immediately behind anterior margin. Parameres as in Fig. 44R, 44N.

FEMALE. As for ♂ except: margin of VII straight, continuous for full width making apex of body truncate; Tg VII with quadrate elevation obsolescent and without pair of tubercles. St VI much shorter than combined length of V and VI. Spermatheca as in Fig. 44C, with short, slightly swollen duct.

MEASUREMENTS. Holotype ♀ first, then ranges of additional 2♂ and 2♀. L: 9.83, 8.00-8.33, 9.50-10.17; W: 5.17, 3.92-4.33, 5.25-5.42; HL: 2.48, 2.08-2.20, 2.56-2.68; HW: 2.48, 2.24, 2.52; PL: 1.08, 0.92, 1.04-1.08; PW: 3.42, 3.00-3.08, 3.42-3.58; AS: I, 0.86, 0.74-0.84, 0.84-0.90; II, 0.44, 0.38-0.40, 0.42-0.48; III, 0.66, 0.60, 0.60-0.68; IV, 0.64, 0.50-0.58, 0.58-0.62.

DISTRIBUTION (Fig. 45). Rainforests of the mountain ranges centred on the Lamington Plateau on the Queensland-N.S.W. border, and in the region from Mt Glorious to the Blackall Ranges and Cooran Tableland further north. Principally a highland species but has been taken occasionally at low altitudes, e.g., Highvale, Kenilworth, Whian Whian. The record for Cunningham's Gap (Kormilev, 1965a) refers to a specimen of *D. consobrina*.

REMARKS. This species shows a disjunct distribution with northern and southern populations separated by the lowlands of the lower Brisbane River valley. In the south its range extends near to the range of its close sister species, *D. consobrina*, along the Macpherson Range. There *D. tertia* extends west as far as Mt Gipps, while *D. consobrina* reaches as far east as Mt Glennie. It will be significant to establish which, if any, species occupies Lever's Plateau which lies between these two mountains.

Drakiessa planula sp. nov.
(Figs 40C, 43K, 44F,J,S)

TYPE. Holotype ♂, Upper Mulgrave River, N. Qld., 30.iv.1970, G.B. Monteith, QMT11670.

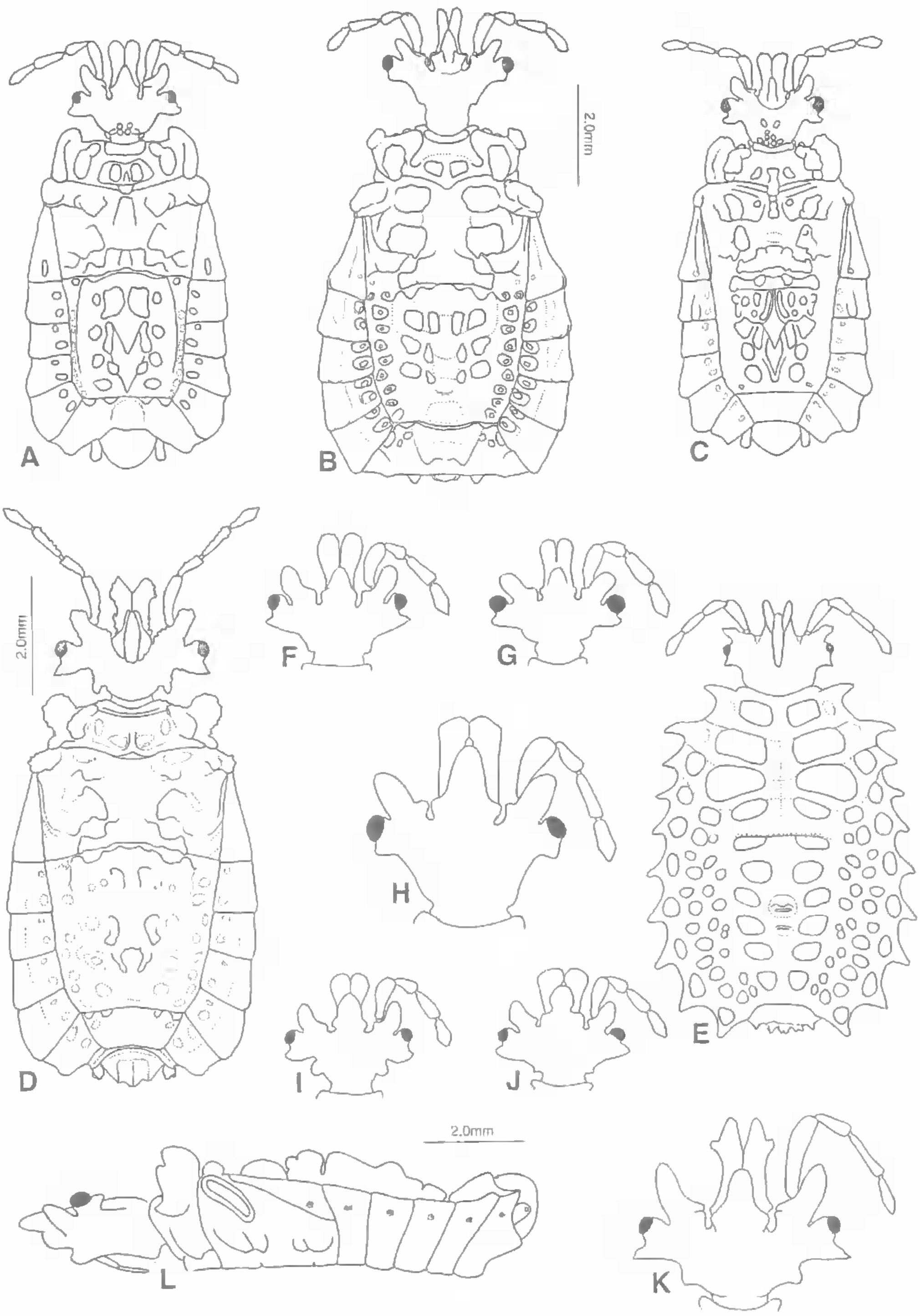

FIG. 40. *Drakiessa* spp. A, *D. consobrina* ♂. B, *D. cantrelli* ♀. C, *D. planula* ♂. D, *D. arelimira* ♂. E, Unknown nymph (Mt Lewis). F-K, heads; F, *D. tertia*; G, *D. parva*; H, *D. hackeri*; I, *D. minor*; J, *D. confusa*; K, *D. virago*. L, *D. glaebula*, side view of ♂.

MATERIAL EXAMINED. Holotype and 9 paratypes. NORTH QUEENSLAND: Crystal Cascades, via Redlynch, 1♀, 9.xii.1964, GBM, in QM; Danbulla, 13km NE Yungaburra, 750m, intercept trap, 1♀, 23.iii-27.iv.1987, RIS & DeFaveri, in MDPI; Upper Mulgrave River, 1♂ 1♀, 30.iv.1970, GBM, 3♂, 25.iv.1968, BKC, in QM, 2♂, 2.iv.1984, A.Calder & TAW, in ANIC; Graham Range, via Babinda, 1♀, 9-10.iv.1979, GBM, in QM. (paratypes: QMT14166-14172).

DESCRIPTION. Medium sized, 7.5-9.0mm long, broad, with explanate pronotal margins and an erect, polished sternal tubercle in the ♂.

MALE. Head about as wide as long, its dorsum with scattered curled setae; vertex with a double row of irregular granules, flanked by one large granule on each side in occipital region; postocular tubercles narrow, apically pointed and with curved posterior margins; mesad of postocular tubercles head margin angularly incised; eyes exserted, with a deep, wide cleft between them and antenniferous tubercles; antenniferous tubercles bent forwards, with blunt apices, surpassing eyes by about 1½ eye diameters; genal processes long, usually not contiguous, apically swollen, reaching just beyond apex of first antennal segment. Rostral groove closed posteriorly. Antennae with segment I longest, II shortest, and III a little longer than IV; segments II and III with adpressed setae.

Pronotum with explanate lateral margins rounded, reaching beyond collar anteriorly, and to hind angles posteriorly; sublateral elevations large, irregular, almost connected to tubercles which oppose against collar; median line of pronotum with a row of large granules leading posteriorly to a large, usually bifid, tubercle on posterior pronotal margin which is opposed against a tubercle on the mesonotal scutellar region. Mesonotal and metanotal sublateral elevations subequal in size, rugose; scutellar area usually rugose; metathoracic scent gland orifice long, curved, narrowly open.

Abdominal Tg I with a bilobed, median elevation subtending opposable tubercles against the metathoraic elevations and posteriorly against Tg II; fused tergal disc rather flat with an irregular, rugose, longitudinal ridge on each side of anterior half; pattern of glabrous areas marked by setose ridges; inner glabrous areas of Tg III subdivided by 2 ridges, those of IV subdivided by one ridge, those of V and VI undivided. Sides of abdomen subparallel, with posterolateral angles of V and VI roundly protruding; inner margin of Cx II carinate and Cx III with a short median carina; margins of Cx VII angulate. Paratergites of VIII short, cylindrical, with dorsal side of apex slightly produced. St VII with a polished, capitate tubercle about 0.15mm in diameter at midline immediately posterior to anterior border. Parameres as in Fig. 44S.

FEMALE. As for ♂ except: Cx IV-VI also with dorsal carinae; Tg VII with a low quadrate elevation and 2 transverse tubercles near hind margin; St VII shorter than combined lengths of V and VI.

MEASUREMENTS. Holotype ♂ first, then ranges of additional 2♂ and 2♀. L: 8.00, 7.50-7.83, 8.33-9.00; W: 4.17, 3.83-4.00, 4.33-4.75; HL: 2.08, 1.88, 2.08-2.16; HW: 2.08, 2.00, 2.04-2.24; PL: 0.96, 0.84, 0.88-0.92; PW: 2.88, 2.72-2.80, 2.80-3.08; AS: I, 0.72, 0.68-0.70, 0.70; II, 0.42, 0.42-0.44, 0.42; III, 0.62, 0.60-0.62, 0.60-0.62; IV, 0.56, 0.52-0.54, 0.54-0.62.

DISTRIBUTION (Fig. 45). Uncommon, in rainforests in the Cairns region, N Queensland. All are from lowlands except Danbulla at 750m on the N Atherton Tableland.

REMARKS. *D. planula* is closely related to *D. minor* from the range of which it is separated by about 500km. The new species differs in its broader, flatter form and by the fact that it inhabits wet rainforests instead of the open forests and dry rainforests inhabited by *D. minor*.

Drakiessa minor Kormilev, 1963
(Figs. 40I, 43C,H, 44T,H,b)

Drakiessa minor Kormilev, 1963: 446 (descr., fig.); Kormilev, 1965a: 26 (incl. in key); Kormilev & Froeschner, 1987: 169 (listed).

TYPE. Holotype ♂, 'Rkhpton', in NRS. Examined. Kormilev (1963) referred the locality of the type species to New Guinea but later (Kormilev, 1965a) correctly referred it to Rockhampton in Queensland.

MATERIAL EXAMINED. Holotype and 35 specimens: CENTRAL QUEENSLAND: Eungella Nat. Pk., Broken River, 1♀, 18-19.iv.1979, GBM; Conway Beach, SW Proserpine, 1♀, 16.v.1990, J. Stanisic & D. Potter, in QM; Rockhampton, 1♀ paratype, in Drake Collection (NMNH), ♀ allotype, in NRS. SOUTH QUEENSLAND: Forest Station, 2,000', Bulburin SF, via Many Peaks, 5♂ 3♀, 2-5.iv.1972, GBM; Cobb's Hill, via Cloyna, 1♀, 1 N, 24.x.1992, S. Hamlet; Upper Yarraman SF, 2♂ 2♀, 2.x.1979, GBM & SRM; Gold Creek, via Brookfield, 1♀, 28.iv.1964, GBM; Brookfield, 1♀, 2N, 19.x.1964, GBM; Bahrs Scrub, via Beenleigh, 1♂ 3♀ 9N, 9.x.1987, M. DeBaar, in QM.

(QM duplicates lodged in BMNH, EH, NMNH, UQIC).

DESCRIPTION. Small, 7.3-8.2mm long, narrow with explanate pronotal margins and a small, capitate, polished sternal tubercle in the ♂. This species is very close to *D. planula* and the description is confined to differences from that species.

Head with genal processes usually contiguous in front of clypeus and with incision behind postocular processes deeper; explanate lobes of pronotum narrower, projecting anteriorly only a little; median row of granules of pronotum smaller; median, posterior, marginal tubercle of pronotum smaller, not bifid; mesonotal sublateral elevations smaller, less rugose; postero-lateral angles of Cx V and VI not protruding; angulations of Cx VII blunter in ♂; parameres as in Fig. 44T; spermatheca (Fig. 44b) with a large, thick-walled chamber developed in its short duct.

MEASUREMENTS. Holotype ♂ first, allotype second, then ranges of additional 2♂ and 2♀. L: 7.67, 8.67, 7.33-7.50, 7.50-8.17; W: 3.83, 4.58, 3.58-3.75, 3.75-3.92; HL: 1.80, 1.88, 1.76-1.80, 1.80-1.84; HW: 1.96, 2.20, 1.88-1.96, 1.92-2.00; PL: 0.94, 1.00, 0.84-0.88, 0.84-0.88; PW: 2.52, 3.08, 2.40-2.44, 2.60-2.67; AS: I, 0.60, 0.64, 0.60-0.64, 0.66-0.70; II, 0.36, 0.40, 0.38-0.40, 0.36-0.40; III, 0.52, 0.56, 0.54-0.58, 0.56; IV, 0.48, 0.46, 0.48-0.54, 0.48-0.50.

DISTRIBUTION (Fig. 45). Eungella to Brisbane in central and southern Queensland, in open eucalypt forest and in dry rainforest.

REMARKS. *D. minor* is sympatric with *D. confusa* and *D. tertia* in the southern part of its range but does not seem to enter the wetter rainforests inhabited by those species. If intermediate populations are discovered between the ranges of *D. minor* and its disjunct sister species, *D. planula*, from N Queensland then their separate specific status may require assessment.

Drakiessa confusa Kormilev, 1965
(Figs 2B, 40J, 43J,L, 44X,B,L,a)

Drakiessa confusa Kormilev, 1965a: 25 (descr.); Kumar, 1967 (internal anatomy); Kormilev & Froeschner, 1987: 169 (listed).

TYPE. Holotype ♀, Mt Mee Forestry Reserve, S.E. Qld., 11.x.1964, G.B. Monteith, QMT6328. Examined.

MATERIAL EXAMINED. Holotype and 51 specimens: SOUTH QUEENSLAND: Cooran Tableland, 2♂, 12.iv.1995, GBM, in QM; Jimna SF, Derrier L.A., 3♂ 1♀, 1.viii.1984, J. Tierney, in QFS; Jimna Range, via Kilcoy, 1♂ 1♀, 9.xii.1966, GBM; Mt Mee Forestry Reserve, allotype ♂, 1♂ 3♀ paratypes, 11.x.1964, GBM, in QM, 1♀, 11.x.1964, GBM, in ANIC, 1♂ 4♀, 11.x.1964, GBM, 7♂ 4♀, 7.iv.1974, GBM, 11♂ 9♀, 16.iv.1972, GBM; Mt Glorious, 1♂, 28.ii.1965, GBM, in QM. (QM duplicates lodged in BMNH, SAM, EH, UQIC) (paratypes: QMT29801-29805).

DESCRIPTION. Small, 7-8.7mm long, non-flattened, with opaque body surface and pronotum not depressed in middle.

MALE. Head about as wide as long; vertex with 2 rows of granules converging posteriorly; postocular tubercles broad, angular, extending laterally beyond outer profile of eyes; eyes separated from antenniferous tubercles by a wide cleft; antenniferous tubercles short, broad, blunt, with lateral margins parallel; genal processes blunt, with lateral margins angulate, and with apices bent mesally, contiguous, enclosing a foramen between their bases anterior to clypeal apex. Rostral groove closed posteriorly. Antennae short, not or barely longer than head; all segments of equal diameter; segment I longest, segment II shortest, segments III and IV subequal; segments II and III with adpressed setae.

Pronotum about 3 times as wide as long; anterolateral angles with narrow explanate margins which terminate posteriorly slightly before hind angles; sublateral elevations low, each forming a granular ridge terminating anteriorly in tubercles opposable against the collar; middle of pronotum not depressed, slightly inflated, with a median row of granules; hind pronotal margin bordered, with a median tubercle subtended posteriorly against the scutellar region. Mesonotal and metanotal sublateral elevations low and granular; scutellar area moderately inflated and rugose. Metathoracic scent gland orifice straight, rather widely open.

Abdominal tergal disc slightly inflated in anterior half and with a weak longitudinal ridge on each side laterad of inner glabrous areas of Tg III; pattern of glabrous areas delineated by weak, setose ridges; inner glabrous areas of III subdivided by 2 ridges, those of IV subdivided by one ridge, those of V and VI undivided; median scent gland scar contrastingly pale; posterolateral angles of Cx II-VI not protruding; margins of Cx VII strongly angulate; Tg VII usually with 4 small tubercle along hind margin; paratergites of VIII short, cylindrical, with dorsal side of apex slightly produced. St with pattern of glabrous area relatively weakly impressed; St VII with a capitate, polished tubercle about 0.2mm in diameter near anterior margin. Parameres as in Fig. 44X.

FEMALE. As for ♂ except: Tg VII with a high quadrate elevation and a pair of transverse tubercles; margin of Cx VII with weak angulations; median length of St VII longer than that of V and VI combined. Spermatheca with short, simple duct (Fig. 44a).

MEASUREMENTS. Holotype ♀ first, then ranges of additional 2♂ and 2♀. L: 8.33, 7.17-7.67, 7.00-8.67; W: 4.17, 3.16-3.50, 3.16-4.33; HL: 2.04, 1.88-1.96, 1.80-2.12; HW: 2.16, 1.84-2.00, 1.76-2.32; PL: 0.88, 0.76-0.88, 0.72-0.96; PW: 2.80; 2.24-2.72, 2.24-3.00; AS: I, 0.66, 0.60, 0.62-0.70; II, 0.36, 0.36-0.38, 0.36-0.38; III, 0.46, 0.50, 0.52; IV, 0.50, 0.50, 0.50.

DISTRIBUTION (Fig. 45). Mountain rainforests of the subcoastal ranges from Mt Glorious to the Jimna Range and Cooran Tableland, S Queensland. It is very common at the type locality, Mt Mee, but rare elsewhere.

REMARKS. Although part of the species complex including *D. tertia*, *D. consobrina* and *D. planula*, *D. confusa* is isolated from the others in the form of the genae, which resemble those of *D. hackeri*, and in the long St VII of the ♀. The foramen between the base of the genae is usually obscured by debris in freshly collected specimens.

Drakiessa wasselli sp. nov.
(Figs 4M, 41, 43D, 44D,U,g)

TYPE. Holotype ♂, Rocky River, via Coen, Cape York Peninsula, N Qld., 14-16.xii.1964, G.B. Monteith. QMT11671.

MATERIAL EXAMINED. Holotype and 35 paratypes: NORTH QUEENSLAND: West Claudie R., Iron Range, 2♂, 3-10.xii.1985, GBM & DJC, in QM, 1♀, 2.vii.1986, TAW, in ANIC; Iron Range, Cape York Pen., 1♂ 1♀, 5-10.v.1968, GBM, 3♂ 1♀, 11-17.v.1968 GBM, 1♂ 1♀, 28.iv.-4.v.1968, GBM, 4♂ 1♀, 12-18.ii.1976, GBM, 2♂ 1♀, 26-31.v.1971; Mt. Tozer, Iron Range, 1,500', 1♂, 30.iv.1973, GBM, in QM; Mt. Lamond, south slope, Iron Range, ANIC Berl. 314, 1♀, 13.vi.1971, Taylor & Feehan, in ANIC; Leo Creek, 500 m, McIlwraith Range, 2♀, 2-3.xi.1969, BKC, 3♂, 29.vi.-4.vii.1976, GBM & SRM; Upper Lankelly Creek, via Coen, 9♂ 3♀, 10-11.vi.1971, GBM; Rocky River, via Coen, 1♂, 14-16.xii.1964, GBM, in QM. (QM duplicates lodged in BMNH, DJ, SAM, EH, HUB, HNHM, UQIC) (paratypes: QMT29835-29863).

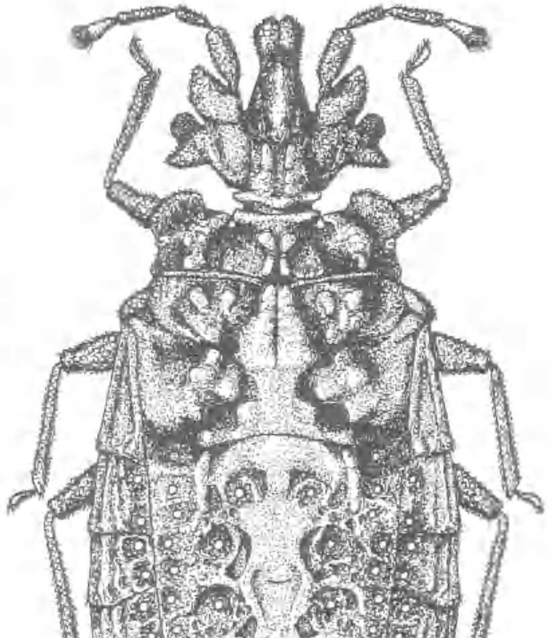

FIG. 41. Dorsal view of holotype ♂ of *Drakiessa wasselli*.

DESCRIPTION. Moderate-sized, 8.3-9.0mm long, with pointed antenniferous tubercles and capitate sternal tubercle in ♂.

MALE. Head slightly wider than long, its dorsum with pale, curled setae; vertex with two irregular rows of granules; postocular tubercles apically acute, directed postero-laterally, surpassing outer profile of eyes; head margin excised mesally of postocular tubercles; eyes with a wide, deep cleft between them and antenniferous tubercles; antenniferous tubercles long, tapering, apically acute, extending beyond eyes by almost 2 eye diameters; genal processes long, subcylindrical, not or almost contiguous, apically sub-acute. Rostral groove closed posteriorly. Antennae about 1.15-1.17 times head length, with segments II and III slender and with adpressed setae; segment III 1.3 times length of segment IV.

Pronotum with projecting, explanate antero-lateral lobes which terminate 1/2 the distance to hind angles; sublateral elevations low, in form of granular ridges running anteriorly to oppose against collar; midline of pronotum with 2 short, longitudinal ridges; posterior margin straight, bordered. Mesonotum with scutellar area raised, rugose, with a median longitudinal groove; sublateral elevations of meso- and metanota low, rugose. Metathoracic scent gland orifice narrowly open.

Abdominal tergal disc flat, with pattern of glabrous areas marked by weak ridges obsolescent along lateral regions; inner glabrous areas of Tg III subdivided by two ridges, those of IV, V and VI subdivided by one ridge; lateral margins of Cx II-V straight; postero-lateral angles of Cx VI strongly protruding; margins of Cx VII with prominent angulations; paratergites of VIII narrow, cylindrical, truncate. St VII with a small, capitate tubercle 0.1mm in diameter situated on midline at anterior third of sternal length. Parameres as in Fig. 44U.

FEMALE. As for ♂ except: posterolateral angles of Cx VI not protruding; margins of Cx VI with small, acute angulations; Tg VII with a quadrate elevation depressed in middle; St VII shorter than combined lengths of V and VI. Spermatheca with a small dilation in its short duct (Fig. 44g).

MEASUREMENTS. Holotype ♂ first, then ranges of additional 2♂ and 2♀. L: 8.33, 8.33, 9.00-9.17; W: 4.17, 4.00-4.25, 4.58-4.83; HL: 2.12, 2.20-2.24, 2.32-2.48; HW: 2.32, 2.28, 2.44-2.60; PL: 0.76, 0.84-0.88, 0.88; PW: 2.76, 2.68-2.80, 3.00-3.25; AS: I, 0.84, 0.90-0.92, 0.90-1.00; II, 0.46, 0.44-0.48, 0.46-0.50; III, 0.64, 0.66-0.68, 0.70; IV, 0.52, 0.50-0.54, 0.52-0.60.

DISTRIBUTION (Fig. 45). Rainforests of lowlands and mountains of Cape York Peninsula from the McIlwraith Range north to Iron Range.

REMARKS. This species is named after the late Lea Wassell, bushman, naturalist and gentleman, who led the author on his first visit to the rainforests of Cape York Peninsula in 1964 when the species was first encountered.

Drakiessa wasselli is the only apterous mezirine of the endemic Australian group of genera to be found in Cape York Peninsula north of the major biogeographic discontinuity at Princess Charlotte Bay. This barrier is one of considerable antiquity (Kikkawa et al., 1981) and hence this species can be considered a relict. It is isolated in the genus but may have some affinities with the *sybilae-virago* species-pair from further south in Queensland.

Drakiessa virago sp. nov.
(Figs 40K, 43E,Q,T, 44W)

TYPE. Holotype ♂, St Margaret's Creek, 2-3,000', Mt Elliot, via Townsville, Qld, 8-9.vi.1972, G.B. & S.R. Monteith, QMT11672.

MATERIAL EXAMINED. Holotype and 45 paratypes: NORTH QUEENSLAND: St Margaret's Creek, Mt Elliot, 2-3,000', via Townsville, 2♂, 1♀, 8-9.vi.1972, GBM & SRM; Mt Elliot NP (Upper North Ck, 1000m), 6♂ 1♀, 2-5.xii.1986, GBM, GIT & S.Hamlet, 11♂, 16♀, 25-27.iii.1991, GBM & DJC; Mt Elliot (summit area, 1000-1200m), 2♂ 3♀, 3.xii.1986, GBM, GIT & S.H, 2♂, 2♀, 26.iii.1991, GBM & DJC, in QM. (QM duplicates lodged in BMNH, DJ, SAM, EH, NMNH, HNHM, MNHG, UQIC) (paratypes: QMT14176-14183, QMT14185-14199, QMT14204, QMT14208-14209, QMT14211-14212, QMT14214-14217, QMT22361-22362).

DESCRIPTION. Large, 9-11.2mm long, flattened, with convex scutellum and erect setae on antennae.

MALE. Head broad and flattened, a little wider than long, its dorsum with scattered erect setae; vertex with obsolescent granules; eyes small, strongly stylate, with postocular tubercles narrow, apically acute, projecting posterolaterally from stylate bases of eyes; cleft between eyes and antenniferous tubercles wide and deep; antenniferous tubercles long, divergent, apically subacute, extending beyond eyes by 2½ eye diameters; genal processes very long, separate, slightly divergent, apically acute and each with a lateral tubercle at mid length. Rostral groove closed posteriorly. Antennae 1.1-1.2 times head length, all segments with erect, straight setae; segments II and III slender; segment I longest, twice length of segment II; segment III longer than segment IV.

Pronotum transverse, with width more than 3 times median length; anterolateral angles with rounded explanate lobes extending posteriorly almost to hind angles; sublateral elevations high, rugose, extending obliquely forward to oppose against collar; midline of pronotum with a row of crowded granules; hind pronotal margin sinuate in middle, bordered. Mesonotum with scutellar area inflated above level of lateral elevations, its surface rugose; sublateral elevations low, rugose; metanotal elevations smooth. Metathoracic scent gland orifice short, rather widely open. Legs with erect setae on femora and tibiae.

Abdominal tergal disc with pattern of glabrous areas marked by smooth ridges; inner glabrous areas of Tg III subdivided by 2 ridges, those of IV, V and VI subdivided by 2 ridges, those of IV, V and VI subdivided by 1 ridge; side of abdomen a little rounded; posterolateral angles of Cx VI slightly protruding; margin of Cx VII with acute angulations; paratergites of VIII moderately prominent, cylindrical, with mesal side of apices produced. Meso-, meta- and abdominal sterna with median impressions weak; St VII without median polished boss. Parameres as in Fig. 44W.

FEMALE. As in ♂ except: body broader, with sides rounded; posterolateral angles of VI not protruding; margins of Cx VII not angulate; median length of St VII longer than combined lengths of V and VI.

MEASUREMENTS. Holotype ♂ first, then additional 1♂ and 1♀ paratypes. L: 9.17, 8.83, 11.17; W: 4.75, 4.58, 6.00; HL: 2.68, 2.60, 3.08; HW: 2.72, 2.68, 3.16; PL: 0.96, 0.92, 1.08; PW: 3.08, 3.08, 3.75; AS: I, 1.18, 1.16, 1.30; II, 0.56, 0.56, 0.60; III, 0.76, 0.74, 0.84; IV, 0.60, 0.64, 0.64.

DISTRIBUTION (Fig. 45). Mountain rainforests on Mt Eliott, an isolated mountain peak a little S of Townsville in N Queensland.

REMARKS. This striking species is related to the even more modified *D. sybilae*, and shares with it the broad, deeply incised head which gives the 2 species their bizarre appearance. The type locality has been little collected but is known to have a number of other endemic flightless rainforest species.

Drakiessa sybilae sp. nov.
(Figs 42, 43B, 44A,M,I,i)

TYPE. Holotype ♂, Eungella National Park, Qld., 10.xii.1965, G.B. Monteith, QMT11673.

MATERIAL EXAMINED. Holotype and 33 paratypes: CENTRAL QUEENSLAND: Mt Macartney, Cathu SF, 1♂ 3♀, 700-850m, QM Berl.54, 21.iv.1979, GBM, 1♀, 600-850m, 20-21.iv.1979, GBM, 2♂ 1♀, 750m, QM Berl.54, 22.iv.1979, GBM, 1♂ 2♀, 750m, QM Berl. 43, 20.iv.1979, GBM; Eungella NP, Upper Cattle Ck, 900m, 1♂, 1♀, 17.xi.1992, GBM, GIT, DJC, & HJ; Eungella NP, Mt William, 1200m, QM Berl.37, 3♂, 19.iv.1979, GBM; Eungella NP, Dalrymple Heights, 2♀, 19.iv.1979, GBM; Eungella NP, 3♂ 2♀, 10.xii.1965, GBM, 3♂ 3♀, 2.i.1965, GBM, 1♂ 1♀, 18.iv.1968, GBM; Finch Hatton Gorge, via Finch Hatton, 300m, 1♀, 19.iv.68, GBM, 2♂, 18.xi.1992, GBM, GIT, DJC & HJ, in QM.

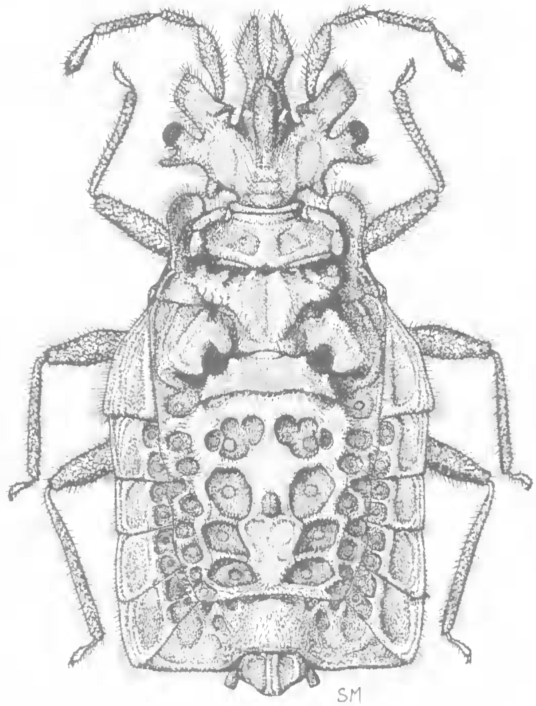

FIG. 42. Dorsal view of holotype ♂ of *Drakiessa sybilae*.

(QM duplicates lodged in BMNH, SAM, EH, NMNH, UQIC) (paratypes: QMT29806-29827).

DESCRIPTION. Medium-sized, 8.2-10.2mm long, flattened species with depressed scutellum and erect setae on antennae and body.

MALE. Head very broad and flattened, with width a little more then length; vertex smooth; hind margin of head with a prominent, rounded lobe on each side of neck; eye small, extremely stylate, with postocular tubercles present as posterolaterally directed, acute processes on the stylate bases of eyes; cleft between eyes and antenniferous tubercles very wide and deep; antenniferous tubercles broad, flattened, subrectangular, with apices obliquely truncate; genal processes long, separate, apically sub-acute and with angulate lateral margins. Rostral groove closed posteriorly. Antennae 1.15-1.3 times head length, all segments with long, erect, straight setae; segment I longest, a little less than twice length of II; segment III 1.3 times length of IV.

Pronotum a little narrower than head, with erect setae on elevations, collar and margins; lateral margins straight, with explanate edges which project forward as rounded lobes and continue posteriorly to hind angles; sublateral elevations present as high ridges which project freely over hind pronotal border to oppose against the mesonotal elevations; middle of pronotum depressed and flat; hind pronotal margin with a pair of median projections opposing weak tubercles on the scutellar area. Mesonotal elevations with 2 anterior tubercles and 1 posterior; scutellar area flat, with a median longitudinal depression; metanotal elevations each with a prominent anterior tubercle and 2 smaller posterior ones. Metathoracic scent gland orifice short, straight, rather widely open. Legs with dense, erect setae on femora and tibiae.

Abdominal tergal disc flat, with scent gland scar forming a large, smooth, median longitudinal region; pattern of glabrous areas poorly defined by low ridges; ridges subdividing inner glabrous areas of tergal disc obsolete. Sides of abdomen straight, with apex truncate at right angles; Cx of II short, broad, slightly projecting; margins of Cx VII straight; paratergites of VIII long, cylindrical, truncate. St VII with a median, raised, flat boss; all abdominal spiracles raised on low tubercles. Parameres as in Fig. 44M.

FEMALE. As for ♂ except: Tg VII with a low quadrate elevation depressed in middle; St VII with median length greater than that of V and VI combined. Spermathecal duct slightly dilated and sclerotised (Fig. 44i).

MEASUREMENTS. Holotype ♂ first, then ranges of additional 2♂ and 2♀. L: 8.17, 8.33-8.83, 9.50-10.17; W: 4.17, 4.33-4.58, 5.00-5.42; HL: 2.24, 2.32-2.40, 2.68; HW: 2.48, 2.52-2.60, 2.80-3.00; PL: 0.80, 0.80-0.88, 0.96; PW: 2.48, 2.48-2.64, 2.80-3.00; AS: I, 0.90, 0.90-1.00, 0.96-1.10; II, 0.54, 0.50-0.56, 0.58-0.60; III, 0.78, 0.80, 0.80-0.84; IV, 0.62, 0.58-0.60, 0.64-0.66.

DISTRIBUTION (Fig. 45). Mountain rainforests in the Clarke Range region west of Mackay, central Queensland.

REMARKS. This is one of Australia's most unusual aradids and I am pleased to name it for my wife, Sybil, who has joined me in many a wet forest to collect these curious creatures, and whose illustrative skill lightens my task in describing them. *D. sybilae* exhibits the most extreme case of depressed form in a genus of otherwise mostly stout, robust species. Its stylate eyes and attenuated head processes give it a bizarre appearance. *D. sybilae* and its relative *D. virago* are found on small, little-decayed logs and sticks.

Drakiessa arelimira sp. nov.
(Fig. 40D)

MATERIAL. Holotype ♂, QLD, 21°34'S, 149°12'E, Upper E. Funnel Ck, 200-450m, 15-16.xi.1992, Monteith, Thompson, Cook & Janetzki, QMT26089.

DESCRIPTION. Medium-sized, ♂ 8.78mm long, flattened, with depressed scutellum, erect setae on body and appendages, and toothed outer margins to the genal processes.

MALE. Head broad and flattened, width slightly greater than length; vertex with several large surface granules; hind margin of head with a prominent, backwardly directed lobe on each side of neck; eyes small, extremely stylate, with postocular processes as flattened, triangular projections from the stylate bases of the eyes; cleft between eyes and antenniferous tubercles wide and deep; antenniferous tubercles reaching about 1/3 length of antennal segment I, their apices rounded; genal processes broad, contiguous in front of clypeus, then with apices broad and divergent, their lateral margins irregularly toothed. Rostral groove closed posteriorly. Antennae 1.2 times head length, all segments with long, straight, erect setae; segment I longest, a little less than twice length of II; segment III 1.2 times length of IV.

Pronotum a little wider than head, with erect setae on elevations and margins; anterolateral angles in form of large, flattened, rounded lobes which terminate before the hind angles; sublateral elevations raised, linear, running obliquely the whole length of prothorax and projecting forward to oppose the tubercles on the collar; middle of pronotum depressed and flat; hind pronotal margin almost straight. Mesonotal elevations with only a posterior opposable tubercle; scutellar area depressed and smooth. Metanotal elevations each with an anterior tubercle and two posteriorly directed ones. Metathoracic scent gland orifice short, straight, narrow. Legs with erect setae on femora and tibiae.

Abdominal tergal disc flat, with pattern of glabrous areas well marked. Margin of CxVII strongly angled; paratergites of VIII cylindrical, slightly pointed with spiracle subterminal. St VII smooth and polished in centre. Abdominal spiracles not raised on tubercles.

FEMALE. Unknown.

MEASUREMENTS. Holotype ♂, L: 8.78; W: 4.06; HL: 2.18; HW: 2.54; PL: 0.85; PW: 2.96; AS: I, 0.83; II, 0.48; III, 0.71; IV, 0.60

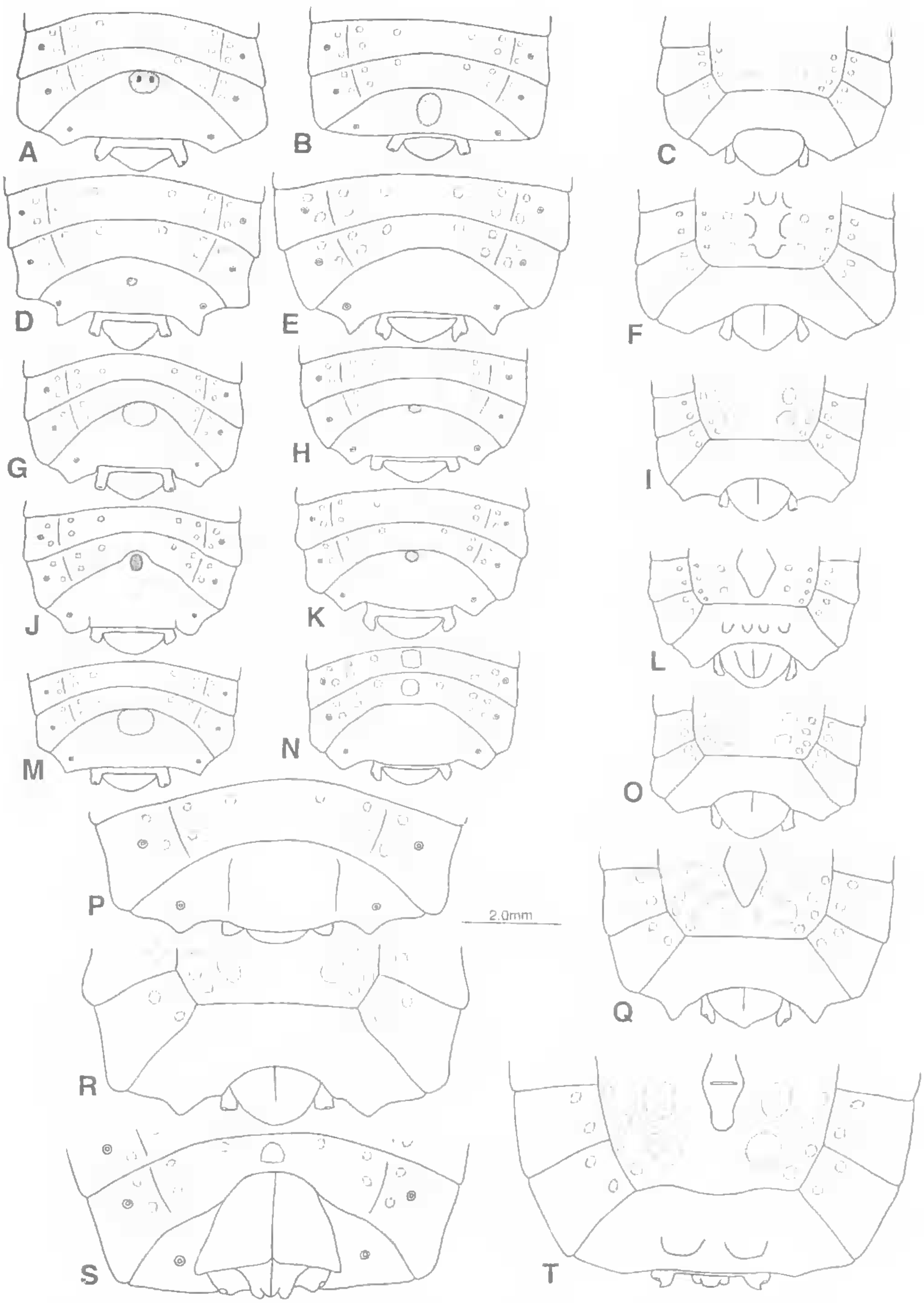

FIG. 43. *Drakiessa* spp., abdominal apices, dorsal (d) and ventral (v); A, *D. tertia* ♂ v; B, *D. sybilae* ♂ v; C, *D. minor* ♂ d; D, *D. wasselli* ♂ v; E, *D. virago* ♂ v; F, *D. tertia* ♂ d; G, *D. consobrina* ♂ v; H, *D. minor* ♂ v; I, *D. cantrelli* ♂ d; J, *D. confusa* ♂ v; K, *D. planula* ♂ v; L, *D. confusa* ♂ d; M, *D. glaebula* ♂ v; N, *D. parva* ♂ v; O, *D. parva* ♂ d; P, *D. hackeri* ♂ v, Q, *D. virago* ♂ d; R, *D. hackeri* ♂ d; S, *D. hackeri* ♀ v; T, *D. virago* ♀ d.

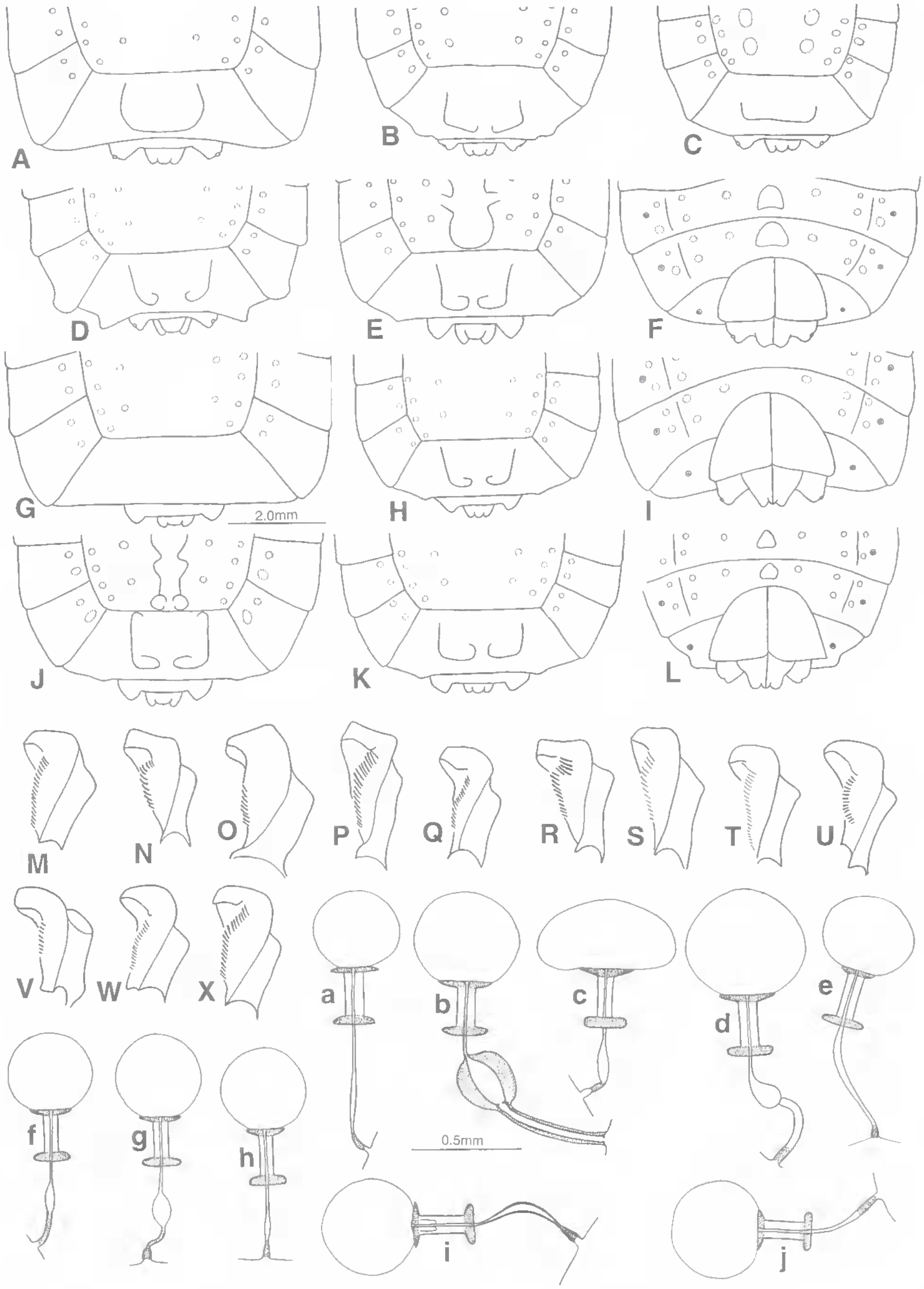

FIG. 44. *Drakiessa* spp.; A-L, ♀ abdominal apices, dorsal (d) and ventral (v); A, *D. sybilae* d; B, *D. confusa* d; C, *D. parva* d; D, *D. wasselli* d; E, *D. consobrina* d; F, *D. planula* v; G, *D. tertia* d; H, *D. minor* d; I, *D. sybilae* v; J, *D. planula* d; K, *D. glaebula* d; L, *D. confusa* v; M-X, left parameres, inner view; M, *D. sybilae*; N, *D. tertia*; O, *D. hackeri*; P, *D. consobrina*; Q, *D. parva*; R, *D. tertia*; S, *D. planula*; T, *D. minor*; U, *D. wasselli*; V, *D. glaebula*; W, *D. virago*; X, *D. confusa*; a-j, spermathecae; a, *D. confusa*; b, *D. minor*; c, *D. tertia*; d, *D. hackeri*; e, *D. cantrelli*; f, *D. consobrina*; g, *D. wasselli*; h, *D. glaebula*; i, *D. sybilae*; j, *D. parva*.

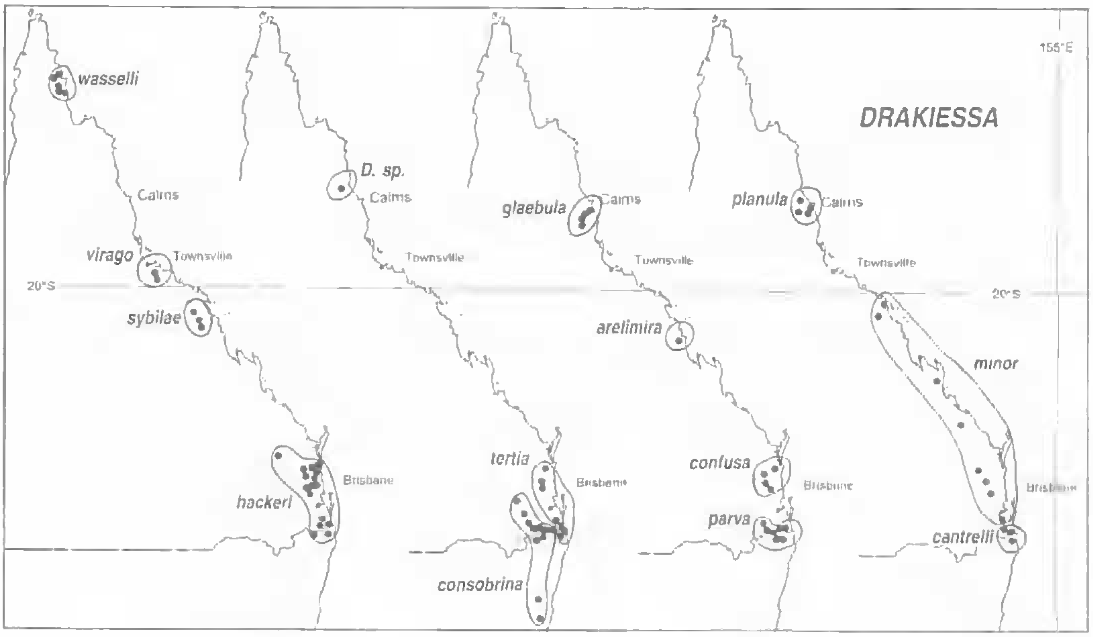

FIG. 45. Records of *Drakiessa* species in eastern Australia.

DISTRIBUTION (Fig. 45). Rainforest on the western fall of the coast range, known there as Black Mountain, a little S of Sarina, Central Queensland.

REMARKS. This rare species is named for Areli Mira, entomologist, formerly of El Salvador, who has mounted untold numbers of insects as part of our rainforest surveys at the Queensland Museum. It forms a clear link geographically and morphologically between the more normal *Drakiessa* of S Queensland and the bizarre, specialized *D. sybilae* of the Clarke Range.

Drakiessa unnamed species (Fig. 40E)

MATERIAL EXAMINED. NORTH QUEENSLAND: 2.5km N Mt Lewis, via Julatten, 1040m, 1 nymph, 3.xi.1983, DKY & GIT, QMT29293.

REMARKS. This nymph belongs to *Drakiessa* but no adult has yet been collected. It has short antennae, large angular postocular tubercles, and prominent, backwardly curved, pointed processes projecting laterally from the margin of each thoracic and abdominal segment. Nymphs are available for most of the described species in the genus but none bear pointed lateral body processes. It appears most similar to nymphs of the *Drakiessa cantrelli/glaebula* pair which show disjunct distributions S of the locality of this problematic nymph. There are no other species of *Drakiessa* known from the whole complex of mountains forming the Mount Carbine, Cape Tribulation and Mt Finnigan mountain massifs north of Cairns. This species fills that niche. The striking appearance of the nymph indicates that the adult will prove to be a bizarre species.

Chelonoderus Usinger, 1941

Chelonoderus Usinger, 1941: 179 (descr.); Usinger & Matsuda, 1959: 197, 228 (redescr; incl. in key); Kormilev, 1971: 6 (incl. in key); Kormilev & Froeschner, 1987: 122 (catalogue of spp.).

TYPE SPECIES. *Chelonoderus stylatus* Usinger, 1941, by original designation.

DESCRIPTION. Moderate to large, dark coloured, apterous, with sparse surface vestiture.

Head elongate with posterior half tapering rapidly behind eyes to a long cylindrical neck; postocular tubercles absent; eyes small, slightly exserted, without prominent cleft separating them from antenniferous tubercles; antenniferous tubercles long, blunt, strongly divergent with straight outer margins; genal processes long, parallel, and fused for most of length beyond clypeal apex; rostral groove closed behind; rostral atrium closed. Antennae with segments II and III of less diameter than I and IV; segment III longer than II or IV.

Pronotum with median, longitudinal sulcus; elevations at both submedian and sublateral regions; pronotal collar distinct and bearing dorsal and ventral opposable tubercles; hind margin of pronotum bordered except at sides. Scutellar region of mesonotum forming a median longitudinal ridge extending across metanotum to abdominal Tg I; mesonotum with discrete elevations each side of midline which each subtend opposable tubercles against scutellar ridge; metanotal elevations each side of midline and subtending opposable tubercles to raised median plate of abdominal Tg I; inflected cavities between mesonotum and metanotum each side of midline. Legs not bicoloured. Tarsal pulvilli present, spatulate.

Fused abdominal tergal disc not prominently elevated; its pattern of glabrous areas distinct and demarcated by ridges with inner glabrous areas of Tg III and IV subdivided; prominent opposable tubercles between posterior angles of median plate of abdominal tergum I and anterior margin of Tg II; 3 pairs of intersegmental opposable tubercles at junctions between Tg III, IV, V and VI along lateral margins of abdominal tergal disc. Lateral margins of Cx VI and VII lobed in ♂.

Median impressions on meso- and metasterna; patterns of glabrous areas deeply impressed on abdominal sterna.

Spermatheca and its ducts without modifications. Parameres with a row of fine teeth on inner face.

DISTRIBUTION (Fig. 10c). An Australian endemic confined to the region between Cooktown and Ingham, N Queensland.

REMARKS. *Chelonoderus*, *Pseudoargocoris* and *Aegisocoris* form a compact group of small genera from N Queensland which share several features of the pattern of thoracic opposable tubercles.

Chelonoderus, was one of the earliest apterous genera described (1941) and its name suggests, erroneously, some relationship with the S.E. Asian *Chelonocoris* whose description by Miller (1938) a few years earlier first set hemipterists thinking seriously about apterous Aradidae. *Chelonoderus* became a repository for the unrelated *Chelonoderus hackeri* Drake and *Ch. basilewskyi* Hoberlandt, but these have now been made type-species respectively of *Drakiessa* Usinger & Matsuda, 1959 and *Neochelonoderus* Hoberlandt, 1967.

The 4 species now known to belong to *Chelonoderus* have an inter-related pattern of distribution in N Queensland. They are readily separable from other Australian Mezirinae by the lack of postocular tubercles and the long, tapering posterior portion of the head. Curiously, the nymphs of *Chelonderus* have well-developed postocular tubercles so the striking adult condition is presumably secondary. This supports the view that *Chelonoderus* is more closely related to *Pseudoargocoris* and *Aegisocoris* than first appearances suggest.

KEY TO THE SPECIES OF *CHELONODERUS*

1. Genal processes wider at apex than sub-apically, with apex of each process obliquely truncate and notched . . . . *stylatus* Usinger
   Genal processes parallel-sided in apical half and with apices not notched or truncate 2

2(1). Lateral margin of Cx VII of both sexes produced into a prominent, rounded lobe much larger than the lobe on Cx VI; posterolateral angles of Cx V not produced 3
   Lateral margin of Cx VII forming a small angulate lobe subequal in size to lobe of Cx VI; posterolateral angles of Cx V strongly angulate in ♂ and weakly so in female . . . . *minor*, sp. nov.

3(2). Lobate margin of Cx VII in male strongly inclined laterally so it projects laterally beyond the profile of the much smaller lobe of Cx VI; lateral elevations of pronotum with outer margin slightly higher than mesal portion . . . . *forfex*, sp. nov.
   Lobate margin of Cx VII in male directed obliquely backwards, not projecting laterally beyond the profile of the slightly smaller lobe of Cx VI; lateral elevations of pronotum with outer margins lower than mesal portion . . . . *thompsoni*, sp. nov..

Chelonoderus stylatus Usinger, 1941
(Fig. 47B-C,H,I,P)

Chelonoderus stylatus Usinger, 1941: 179 (descr.; fig.); Usinger & Matsuda, 1959: 229,230 (Fig.); Kormilev, 1963: 446 (locality records); Kormilev, 1967a: 519 (locality records); Kormilev & Froeschner, 1987: 122 (listed).

TYPE. Holotype ♂, N. Queensland, Australia, October 4, 1920, J.A. Kusche, CAS, 5225. Not examined, but good condition ascertained by Dr P.H. Arnaud. Figured by Usinger (1941).

MATERIAL EXAMINED. 208 specimens: NORTH QUEENSLAND: Shipton's Flat, via Helenvale, in QM and ANIC; Moses Ck, 4km NE Mt Finnigan; Mt Finnigan, 350-400m, in ANIC; Mt Finnigan summit, 1100m; Mt Hartley, 35km S Cooktown; Mt Boolbun South; Gap Ck., 8km N. Bloomfield River; Windsor Tbld, 1050m, in QM; Cape Tribulation, in UQIC; Cooper Creek, 16km N. Daintree River; Roaring Meg Valley, 720m; Mt Pieter Botte, 950m; Mt Sorrow, 300-800m; Cape Tribulation; 3km W Cape Tribulation, 500m; 3.5km W Cape Tribulation, 680m, in QM; Table Mtn, 10km, S Cape Tribulation, 320m, in QM; Noah Creek; Thornton Range; Mt Lewis, 10km above Bushy Creek, in ANIC; Mt Lewis; 10km N of Mt Lewis; 2.5km N Mt Lewis, 1040m; Mossman Bluff track; Mossman Gorge; Devil's Thumb, 10km NW Mossman, 1000-1180m; 2km SE Mt Spurgeon; 7km N Mt Spurgeon, 1200m; Pauls Luck, Carbine Tableland; Roots Ck-Francis Ck Divide, 1250m; Kuranda, in QM; 6km SW Kuranda, in MDPI; Cairns district; Cairns vicinity; Mulgrave River, in SAM; Davies Ck, 20km SE Mareeba, in ANIC; 22km SE Mareeba, 900m; Upper Isley Creek, 750m; Mt Williams, 900-1000m, in QM; Danbulla SF, 13km NE Yungaburra, in MDPI; Upper Mulgrave River; Murray Prior Range, via Yarrabah; The Boulders, via Babinda; Bellenden Ker township; Bellenden Ker Range, Cable Tower 7, 500m; Graham Range, via Babinda, in QM: Gordonvale, in QDPI. NORTHERN TERRITORY (?): Port Darwin, in SAM. (QM duplicates lodged in BMNH, MDPI, DJ, EH).

DESCRIPTION. Large, 11-12.5mm long, uniformly black, with short, sparse, adpressed vestiture.

MALE. Head length 1.1-1.2 times width, its surface smooth; antenniferous tubercles strongly divergent, with outer margins continuous with profile of postocular portion of head, and with length beyond exserted eyes about twice eye diameter; apices of antenniferous tubercles weakly notched; cleft between antenniferous tubercles and median process of head wide and deep, with 2 pairs of prominent opposable tubercles in cleft; genal processes long, with apices flared, obliquely truncate, and usually notched. Antennae a little longer than head, segment I longest.

Prothorax with sublateral elevations larger, high and more rugose than submedian elevations which partly occlude median sulcus; pronotal collar smooth dorsally, with dorsal opposable tubercles reduced. Median ridge of meso- and metanota smooth, depressed. Legs slender, unarmed.

Abdomen with tergal disc elevated slightly at middle of Tg II, at position of scent gland scar and sublaterally on Tg III.

Lateral margins of Cx VI and VII produced into subequal, rounded lobes; paratergites of VIII short, cylindrical, truncate with spiracles apical; parameres as in Fig. 47H.

FEMALE. As for ♂ except: Outer connexival margin of VI slightly angled posterolaterally, and that of VII angled in middle; Tg VII with a pair of quadrate elevations near posterior margin; spermatheca as in Fig. 47C.

MEASUREMENTS. Ranges of 2♂ and 2♀. L: 11.20, 12.30-12.50; W: 5.00, 6.16-6.66; HL: 3.16-3.20, 3.30-3.41; HW: 2.66-2.75, 2.91-3.08; PL: 1.25-1.32, 1.41-1.50; PW: 3.20-3.50, 3.66-3.75; AS: I, 1.08, 1.16-1.20, II, 0.60, 0.56-0.60, III, 0.92-1.00, 0.88-1.00, IV, 0.60-0.64, 0.60.

DISTRIBUTION (Fig. 48). The type locality is specified only as 'N. Queensland' and since the species is common in and adjacent to rainforest in the coastal region from Cooktown to Babinda it is probable that the holotype came from the vicinity of Cairns. Kormilev (1967) recorded specimens from the South Australian Museum labelled as 'Port Darwin, W.D. Dodd'. Examination of these specimens shows them to be identical with specimens from the Cairns-Kuranda region within the confirmed range of the species. Since it is inconceivable that an apterous aradid could occur in undifferentiated form at such disjunct locations as Cairns and Darwin, and since Kuranda was the residence of the collector, I prefer to regard the alleged Northern Territory specimens as being mislabelled.

REMARKS. *C. stylatus* was the first apterous aradid described from Australia and is one of the largest species known from the continent. It occurs, singly and in small colonies, on large logs in rainforest but seems rather eurytopic and may occur in cleared and disturbed areas. Its altitudinal range varies within its distribution; in the northern sector it ranges from sea-level to 1250m, but in the south it has not been taken higher than the coastal plain and low foothills. This may be due to competition, in the south, from the other 3 species of the genus which inhabit mountain rainforests in the south but not in the north.

Chelonoderus forfex sp. nov.
(Fig. 47A,E-F,N-O)

TYPE. Holotype ♂, Palmerston Nat. Park, via Innisfail, N Qld, 23.iv.1968, G. Monteith, QMT11674.

MATERIAL EXAMINED. Holotype and 43 paratypes: NORTH QUEENSLAND: Baldy Mtn, via Atherton, pitfall trap, 1♀, ii-xi.1977, RIS, in MDPI, 1♂, 1200m, 10.x.1980, GBM; Upper Plath Road, 1100m, QM Berl. 908, 1♂, 8.xii.1996, GBM; Malanda Falls, Malanda, 2♂ 1♀, 11.v.1970, GBM, 4♂ 2♀, 8-12.x.1980, GBM; Palmerston NP, via Innisfail, 3♂ 1♀, 23-24.v.1970, BKC, 1♀, 7-8.viii.1968, BKC, 1♂, 9.xii.1995, pyrethrum on logs, GBM; Mt Fisher, 7 km SW Millaa Millaa 1050-1100m, 5♂ 1♀, 27-29.iv.1982, GBM, DKY & DJC, 1♂, QM Berl. 888, 17.v.1995, GBM; Downey Creek, 25km SE Millaa Millaa, 400m, 7♂ 6♀, 7.xii.1988, GBM & GIT; Mt Father Clancy, 900-1000m, 2♂, 6.xii.1988, GBM & GIT; Vine Creek Rd, 1100m, 1♂, 24.xi.1994, GBM, in QM; Tully Falls, pitfall trap, 1♀, 12.xii.1976-15.i.1977, RIS, in MDPI. (QM duplicates lodged in BMNH, ANIC, UQIC, SAM, EH, NMNH, HNHM) (paratypes: QMT14042-14062, QMT14067-14070, QMT22364-22367, QMT14073-14084).

DESCRIPTION. Large, 10-12mm long, uniformly black, elongate, with truncate abdominal apex.

MALE. Head length 1.25 times width, with elongate neck region, surface with short, dense vestiture; antenniferous tubercles divergent, straight-sided, extending beyond eyes by a distance equal to eye diameter, apices subacute, not notched; genal processes long, parallel, with evenly rounded apices; 2 pairs of opposable tubercles in cleft between antenniferous tubercles and median process of head but not prominent. Antennae slightly longer than head, segment I longest.

Prothorax with sublateral elevations lower than lateral margins; submedian elevations smoothly continuous with pronotal collar; dorsal opposable tubercles of collar reduced; median ridge of meso- and metanota smooth, depressed in middle. Legs slender, unarmed.

Abdominal tergal disc slightly elevated at middle of Tg II, at scent gland scar and sublaterally on Tg III; lateral series of opposable tubercles weak; lateral margins of Cx II-V not lobed and progressively narrowing posteriorly, that of VI with a small, round lobe in posterior half, and that of VII strongly produced into laterally projecting, rounded lobes; paratergites of VIII short, cylindrical, truncate, with spiracles apical. Parameres as in Fig. 47F. St of VII with a subquadrate, smooth, glabrous area medially.

FEMALE. As for ♂ except: Sides of abdomen convex; lobes of Cx VI and VII much smaller than in ♂, with those of VII directed more posteriorly; median disc of Tg VII with quadrate elevation bearing 2 low tubercles posteriorly. Spermatheca as in Fig. 47E.

MEASUREMENTS. Holotype ♂ first, then ranges of additional 2♂ and 2♀ paratypes. L: 10.66, 10.00-10.16, 10.66-12.16; W: 4.83, 4.58, 5.42-6.42; HL: 3.00, 2.92, 2.92-3.33; HW: 2.42, 2.33, 2.42-2.66; PL: 1.42, 1.16-1.25, 1.33-1.50; PW: 3.25, 3.00-3.08, 3.17-3.75; AS: I, 1.00, 1.00-1.04, 1.08-1.20; II, 0.60, 0.56-0.6, 0.60-0.68; III, 0.92, 0.92-1.00, 0.96-1.00; IV, 0.60, 0.60-0.64, 0.60-0.68.

DISTRIBUTION (Fig. 48). Mountain rainforest above 350m on the S Atherton Tableland with several records from the Walsh Range (Baldy Mtn) at the N end of the Tableland.

REMARKS. *C. forfex is* related to the type species but is easily separable by the shape of the antenniferous tubercles, genal processes and abdominal apex. The 2 species are not known to be sympatric although their distributions overlap a little latitudinally at different altitudes.

Chelonoderus thompsoni sp. nov. (Fig. 47J)

TYPE. Holotype ♂, Wallaman Falls Rd, 600m, RF, N.E.Qld, 14 Dec 1986, Monteith, Thompson & Hamlet, QMT11829.

MATERIAL EXAMINED. Holotype and 23 paratypes: NORTH QUEENSLAND: Kirrama SF, via Cardwell, 1♀, 17-18.viii.1966, GBM, 1♂, 700m, 2-3.x.1980, GBM, 1♂ 1♀, 650m, 11.v.1983, DKY; Mt Hosie, 800-930m, Kirrama SF, 3♂ 3♀, 10.xii.1986, 10.xii.1986; Douglas Ck Rd, 800m, Kirrama SF, 1♂, 9-12.xii.1986, GBM, GIT & SH; Cardwell Ra., Upper Broadwater Ck valley, 700-800, 3♂ 1♀, 17-21.xi.1986, GBM, GIT & SH; Cardwell Range, 28km W of Kennedy, 1♀, 2.vi.1989, R. Bell; Mt Graham, 8km N Abergowrie, 600-700m, 1♂, 26-30.xii.1986, SH; Wallaman Falls, via Ingham 2♂ 2♀, 7.viii.1968, BKC, 3♂ 1♀, 600m, 14.xii.1986, GBM, GIT & SH, in QM. (QM duplicates lodged in BMNH, ANIC, EH) (paratypes: QMT14088, QMT14110-14126, QMT14128, QMT14130-14131).

DESCRIPTION. Large, 9-12.5mm long, uniformly black, elongate, similar to *C. forfex* but differing in the following respects. Pronotum with outer edge of sublateral elevations slightly lower than the mesal portion of the elevation. Male: with margin of Cx VII produced into a smaller lobe which is directed obliquely backwards so that its lateral margin does not extend laterally beyond the profile of the smaller lobe of Cx VI.

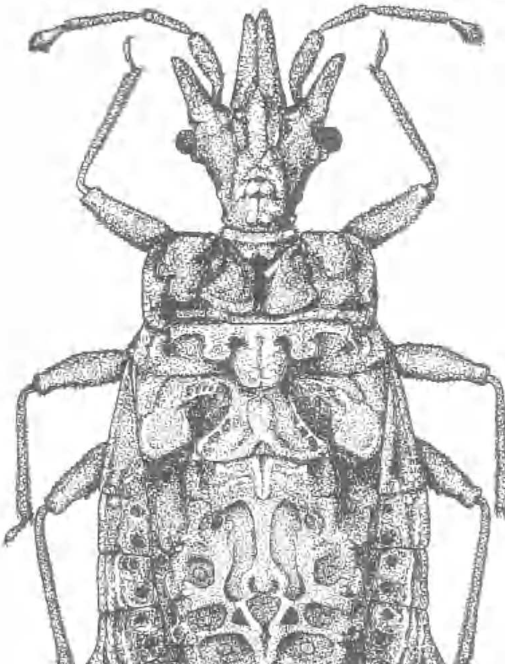

FIG. 46. Dorsal view of holotype of ♂ *Chelonoderus minor*.

MEASUREMENTS. Holotype ♂ first, then range of 2♂ and 2♀ paratypes. L: 9.12, 10.37-10.50, 10.62-12.50; W: 4.25, 4.75-4.90, 5.58-6.50; HL: 2.65, 3.00-2.75, 3.05-3.50; HW: 2.10, 2.30-2.50, 2.40-2.75; PL: 1.00, 1.20-1.10, 1.25-1.50; PW: 2.60, 2.90-3.00, 2.95-3.75; AS: I, 0.90, 1.15-1.06, 1.05-1.15; II, 0.52, 0.55-0.58, 0.55-0.61; III, O.86, 1.00-1.06, 0.96-1.06; IV, 0.58, 0.58-0.63, 0.60-0.67.

DISTRIBUTION (Fig. 48). Mountain rainforests on the Kirrama, Cardwell and Seaview Ranges, N Queensland.

REMARKS. This species is named after Geoff Thompson, Queensland Museum, who has collected many tropical Aradidae and illustrated many species for this revision.

C. thompsoni is the geographically isolated, southern member of the group of 3 larger species which occur as allopatric derivatives in rainforest tracts of the wet tropics. It is closely related to *C. forfex* but ♂ lack the flared apical abdominal segments of that species. ♀ of the 2 species are difficult to separate.

Chelonoderus minor sp. nov.
(Figs 4N, 46, 47D,G,K-M)

TYPE. Holotype ♂, Millaa Millaa Falls, N. Qld., 4.xii.1965, G.B. Monteith, QMT11675.

MATERIAL EXAMINED. Holotype and 16 paratypes: NORTH QUEENSLAND: Lake Eacham NP, 760m, ANIC Berl.549, rainforest, 1♀, 3-7.xi.1976, R.W. Taylor and TAW; 1.5km E. of Palmerston, 1♂, 6.xi.1966, E.B. Britton, in ANIC; Crater NP, Atherton Tableland, 1♂, 25.iv.1970, GBM, 1♂, 5.xii.1988, GBM; Malanda, 1♀, 9.xi.1989, TAW; Malanda Falls, 2♂, 2♀, 9.xii.1989-14.i.1990, GBM, GIT & HJ; Upper Mulgrave River, 1♀, 26-27.xii.1967, GBM; Mt Bartle Frere, West Slopes, 800-1000m, 2♂, 30.xii.1989, GBM; Palmerston NP, 3♂ 2♀, 23.iv.1968, GBM; 1♂ 1♀, 7-8.viii.1968, BKC; Henrietta Ck, Palmerston NP, 1♂ 1♀, 12.xii.1966, BKC; Millaa Millaa Falls, 1♂, 23.iv.1968, GBM, in QM. (QM duplicates lodged in BMNH, ANIC, SAM, EH) (paratypes: QMT14089-14102, QMT14104-14105).

DESCRIPTION. Medium sized, 8.8-10.3mm long, black, with contrastingly pale abdominal scent gland scar.

MALE. Head length 1.25 times width, its dorsum rugose in middle; antenniferous tubercles long, divergent, with sides straight, extending beyond eyes by a distance equal to more than twice eye diameter, apices subacute, not notched; genal processes long, parallel-sided, with apices separate, subacute and not individually notched; opposable tubercles in cleft between antenniferous tubercles and median head process small. Antennae slightly longer than head, segment I and II longest, subequal.

Pronotum with sublateral elevations slightly higher than lateral margins; submedian elevations not continuous with collar; dorsal opposable tubercles of collar well developed; median ridge of mesonotum coarsely wrinkled. Legs slender, often with a small, subapical peg on ventral side of hind femora.

Abdominal tergal disc broadly elevated anteriorly and along the lateral margins where the series of opposable tubercles are prominent; disc depressed in posterior half except for raised, pale scent gland scar; margins of Cx II-IV not lobed, those if V, VI and VII each with a pointed, triangular projection on posterior half; paratergites of VIII short, cylindrical, with slightly oblique apices. Parameres as in

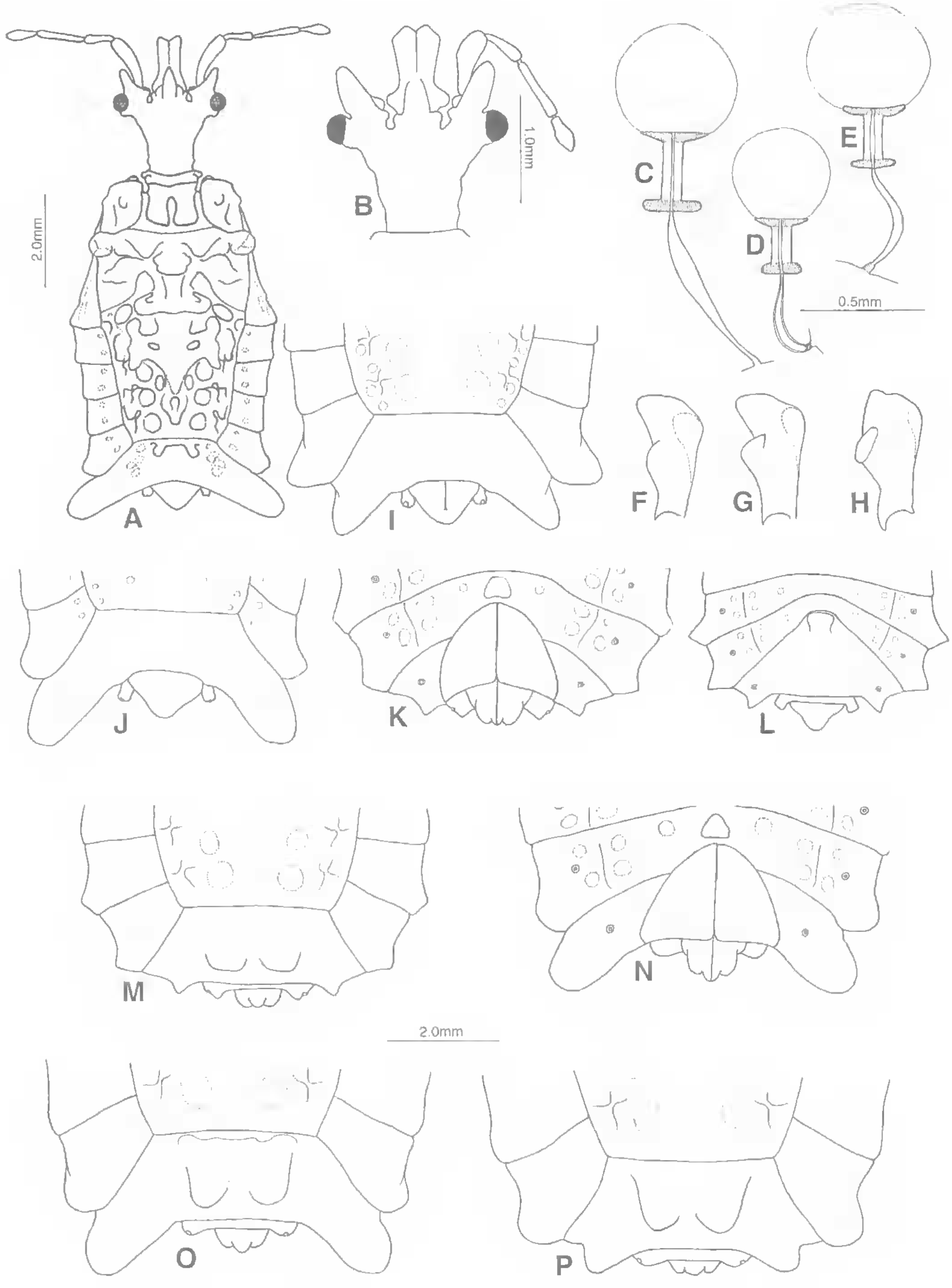

FIG. 47. *Chelonoderus* spp.; A, *C. forfex* ♂; B, *C. stylatus* head; C-E, spermathecae; C, *C. stylatus*; D, *C. minor*; E, *C. forfex*; F-H, left parameres, outer views; F, *C. forfex*; G, *C. minor*; H, *C. stylatus*; I-P, abdominal apices, dorsal (d) and ventral (v); I, *C. stylatus* ♂ d; J, *C. thompsoni* ♂ d; K, *C. minor* ♀ v; L, *C. minor* ♂ v; M, *C. minor* ♀ d; N, *C. forfex* ♀ v; O, *C. forfex* ♀ d; P, *C. stylatus* ♀ d.

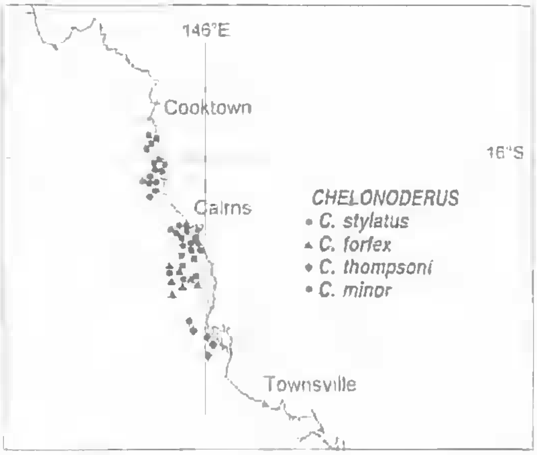

FIG. 48. Records of *Chelonoderus* species in northern Queensland.

Fig. 47G. St VII smooth and glabrous medially and with a semicircular impression near anterior margin; St VI narrowed medially by forward extension of St VII.

FEMALE. As for ♂ except: Abdomen broad, with convex margins; angles of Cx V, VI and VII much reduced; median disc of Tg VII with pronounced quadrate elevation and 2 high, transverse tubercles near posterior margin. Spermatheca as in Fig. 47D.

MEASUREMENTS. Holotype ♂ first, then ranges of additional 2♂ and 2♀. L: 9.17, 8.83-9.17, 9.67-10.33; W: 4.17, 4.08, 5.17-5.42; HL: 2.50, 2.50, 2.58-2.75; HW: 1.92, 1.92-2.00, 2.08-2.17; PL: 1.17, 1.08-1.17, 1.25; PW: 2.92, 2.75-2.83, 3.00-3.16; AS: I, 0.80, 0.80-0.84, 0.80-0.88; II, 0.60, 0.56, 0.56-0.60; III, 0.84, 0.80, 0.84-0.88; IV, 0.48, 0.52, 0.52.

DISTRIBUTION (Fig. 48). Mountain rainforest on the S Atherton Tableland with one specimen from low altitudes in the same region (Mulgrave River).

REMARKS. *C. minor* is distinct within the genus by its smaller size and angled margins of Cx V. It is commonest in better developed rainforest on red, basaltic soils where it occurs on sticks and logs. It coexists with *C. forfex* at several localities in the northern portion of the range of the latter species.

Pseudoargocoris Kormilev, 1992

Argocoris Kormilev, 1967a: 519 (descr.); Kormilev, 1971: 6 (incl.in key); Kormilev & Froeschner, 1987: 103 (catalog. of spp.).
Pseudoargocoris Kormilev, 1992: 184 (n. name for preocc. *Argocoris* Kormilev)

TYPE SPECIES. *Argocoris grossi* Kormilev, 1967a, by original designation.

DESCRIPTION. Moderate-sized, ovate, apterous, with convex dorsum and coarsely granular body surface.

Head about as wide as long; postocular tubercles small, triangular; eyes large and sessile, separated from antenniferous tubercles by a weak, shallow cleft; antenniferous tubercles blunt, weakly divergent; genal processes short, blunt, fused anterior to apex of clypeus; rostral groove not closed posteriorly; rostral atrium closed. Antennae with segments II and III of less diameter than I and IV; segment III longer than II or IV.

Pronotum with median, longitudinal sulcus: elevations at both submedian and sublateral positions, the submedian ones with a smooth, glabrous area surrounded by granules; pronotal collar very distinct and bearing dorsal and ventral opposable tubercles. Scutellar region of mesonotum elevated into a median ridge extending posteriorly to abdominal Tg I; opposable tubercles on each side of base of scutellar elevation; mesonotal wing vestiges defined by sutures. Smooth, glabrous areas on each side of middle of meso- and metanota; metanotum with low granular, sublateral elevations which subtend opposable tubercles against lateral angles of median plate of abdominal Tg I. Legs not bicoloured. Tarsal pulvilli present, spatulate.

Abdominal tergal disc inflated, granular, with pattern of glabrous areas defined by ridges; inner glabrous areas of Tg III and IV subdivided; suture between Tg I and II distinct in middle and obliterated laterally; a pair of opposable tubercles between posterior angles of median plate of abdominal Tg I and anterior edge of Tg II; 3 pairs of intersegmental opposable tubercles at junctions between Tg III, IV, V and VI along lateral margin of abdominal tergal disc.

Median impressions on meso- and metasterna; glabrous areas and intersegmental sutures strongly impressed on abdominal sterna. Parameres with a row of fine teeth on their inner face.

DISTRIBUTION (Fig. 10C). A monotypic, Australian endemic known only from coastal central Queensland.

REMARKS. *Pseudoargocoris* occupies an intermediate position between *Aegisocoris* and *Chelonoderus*, having the postocular tubercles and ovate, convex body shape of the former and the distinctive pronotum of the latter.

Pseudoargocoris grossi (Kormilev, 1967)
(Figs 49, 51A-C)

Argocoris grossi Kormilev, 1967a: 521 (descr., figs); Kormilev & Froeschner, 1987: 103 (listed).
Pseudoargocoris grossi: Kormilev, 1992:184 (n.comb.).

TYPE. Holotype ♀, Bowen, Queensland, A. Simson, SAM I2O,342. Examined. The specimen also bears an old label with the numbers 1531-3550. The type lacks left antennal segments II and IV, right antennal segments II, III and IV, left fore tibiae and tarsi of fore and middle legs.

MATERIAL EXAMINED. Holotype and 17 specimens: CENTRAL QUEENSLAND: Brandy Creek Road, Conway SF, via Proserpine, 10♂ 4♀ 3N, 23-25.iv.1979, GBM, in QM. (QM duplicates lodged in BMNH, ANIC, EH, NMNH, HNHM, UQIC).

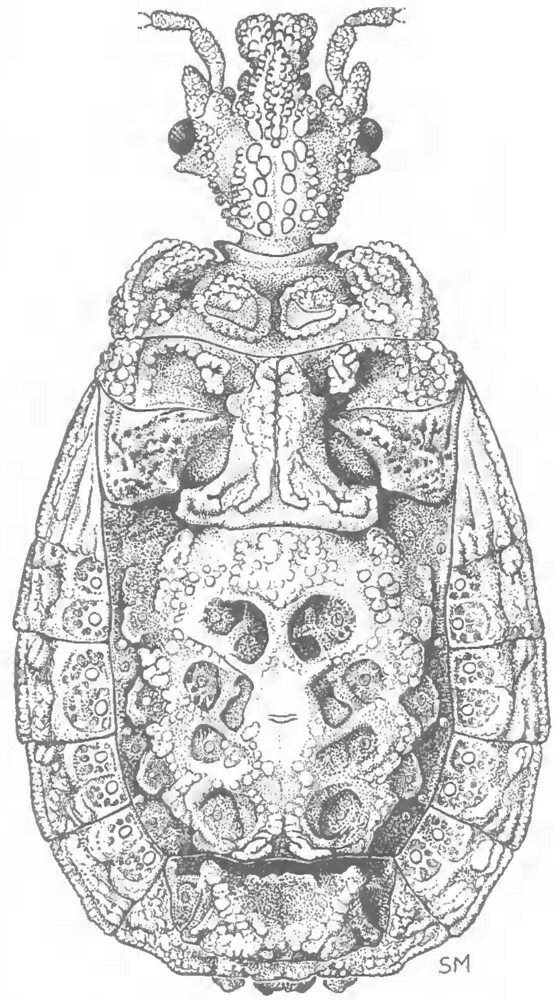

FIG. 49. Dorsal view of holotype ♂ of *Pseudoargocoris grossi.*

DESCRIPTION. Moderate-sized, 9.00mm long, sub-circular, reddish, with coarsely granular, glabrous body surfaces.

MALE. Head length 1.06-1.11 times width, with median ridge raised and bearing large, rough granules; postocular tubercles small, flattened, triangular; eyes sessile, smooth; antenniferous tubercles granular, blunt, extending beyond eyes 1.5 times eye diameter; opposable tubercles in cleft between antenniferous tubercles and median head process large, distinct; genal processes short, broad, granular, fused for full length anterior to clypeus and with apices expanded, confluent, and with front margin truncate.

Pronotum with sides converging anteriorly; submedian elevations each with a laterally attenuate glabrous area surrounded by a granular patch anteriorly and a coarse carina posteriorly; sublateral elevations higher than submedian elevations and roughly granular; pronotal collar smooth, distinct. Mesonotum with scutellar region raised, granular, flanked by a pair of granular, triangular tubercles; mesonotal wing remnants with a granular lateral lobe and a smooth mesal disc; metanotum with raised median ridge continuous with transverse median elevation of abdominal Tg I; lateral metanotal elevations coarsely punctate, separated from median ridge by a smooth gutter beneath the enlarged opposable tubercles; meta-thoracic scent gland openings straight, slit-like. Legs slender, unarmed.

Abdominal tergal disc broadly inflated over whole area, most of pattern of ridges prominently raised and granular; scent gland scar pale with several patches of raised granules; postero-lateral angles of Cx V and VI each with small triangular, blunt lobes; margin of Cx VII with a small angulation; paratergites of VIII short, cylindrical, truncate with spiracles terminal. Abdominal sterna coarsely impressed, punctate, median impressions distinct; St VI greatly narrowed in middle by forward extension of St VII; St VII with a large polished flat area in centre bounded by a fine impressed line.

FEMALE. As for ♂ except: all connexival margins smooth, unlobed and continuous, except for that of VII which has a faint angulation; median disc of Tg VII quadrately elevated with a pair of transverse posterior tubercles; St VI grooved subparallel to hind margin; divided plates of St VII inflated, granular; spiracles of VII raised on low tubercles; paratertgites of VIII low, blunt.

MEASUREMENTS. Holotype ♀ first followed by ranges of 2♂ and 2♀. L: 9.00, 7.92-7.93, 8.37-8.75; W: 5.00, 3.75, 4.50-4.75; HL: 2.24 2.09-2.10, 2.10, 2.25; HW: 2.08, 1.87-1.88, 2.00-2.03; PL: 1.00, 0.85-0.94, 0.90-1.00; PW: 3.16, 2.72-2.87, 2.90-2.97; AS: I, 0.66, 0.60, 0.62-0.63, II, 0.44, 0.42, 0.44-0.46, III, lost, 0.84, 0.86-0.90, IV, lost, 0.52-0.56, 0.56-0.60.

DISTRIBUTION (Fig. 52). Coastal central Queensland near Proserpine.

REMARKS. The unique type from Bowen was collected by local collector August Simson around 1870 (Musgrave, 1932). The Bowen vicinity, though coastal, is rather arid and without rainforest vegetation in which such an apterous aradid would be expected to occur. It is known that Simson ranged quite far afield from Bowen, including as far as the rainforested Mt Dryander, near Proserpine (Fletcher, 1929), which is on the southern side of Edgecumbe Bay. Several modern attempts were made to rediscover the species on Mt Dryander without success. In 1979 a colony was taken on a large log in lowland rainforest at Brandy Creek, E of Proserpine and a little south of Mt Dryander. This proved that *P. grossi* is a rainforest species, making it unlikely that the type came from Bowen.

Aegisocoris Kormilev, 1967

Aegisocoris Kormilev, 1967a: 521 (descr.); Kormilev, 1971: 6 (incl. in key); Kormilev & Froeschner, 1987: 96 (catalogue of spp.).

TYPE SPECIES. *Aegisocoris granulatus* Kormilev, 1967 by original designation.

DESCRIPTION. A genus of medium-sized, ovate, convex, apterous Mezirinae with granular body surface.

Head about as long as wide; postocular tubercles present as narrow triangular lobes; eyes slightly exserted, separated from antenniferous tubercles by a small cleft; antenniferous tubercles divergent, blunt; genal processes short, blunt, without bases contiguous in front of clypeus; rostral groove not closed behind; rostral atrium closed. Antennae with segments II and III of less diameter than I and IV; segments II, III and IV subequal in length.

Pronotum with median longitudinal sulcus bordered by 2 pairs of prominent granular tubercles in submedian region; without sublateral elevations; anterolateral angles of pronotum with semicircular, explanate lobes. Scutellar region of mesonotum forming high, granular elevation, sulcate medially; opposable tubercles on each side of base of scutellar lobe; mesonotal wing vestiges defined by distinct, semicircular sutures; metanotum with a large, smooth, glabrous plate on each side of median elevation; a set of 3 opposable tubercles between metanotum, abdominal Tg I and fore margin of fused abdominal tergal disc. Legs not bicoloured. Tarsal pulvilli present, spatulate.

Abdominal tergal disc highly inflated, granular, with pattern of glabrous areas largely obliterated; suture between Tg I and II distinct in middle and obliterated laterally. Cx VII not lobed in ♂.

Meso- and metasterna with median impression; pleural regions coarsely granular; metathoracic scent gland canals short and widely open; pattern of glabrous areas deeply impressed on abdominal sterna.

Spermathecal duct with inflated, thick-walled bulb. Parameres with row of fine teeth or inner face.

DISTRIBUTION (Fig. 10D). An Australian endemic confined to tropical northern Queensland between Cape Tribulation and Innisfail.

REMARKS. *Aegisocoris* parallels the Australian carventine *Glyptoaptera* Kormilev in its highly convex thoracic and abdominal nota (Monteith, 1967). The prothorax is unusual in having 2 pairs of submedian tubercles; this results from the displacement of the sublateral elevations into the submedian field. The vestigial hemelytral bases are better developed in *Aegisocoris* than in other Australian flightless genera.

KEY TO SPECIES OF *AEGISOCORIS*

1. Each anterolateral angle of pronotum with a small, flattened, semi-erect lobe about the size of the eye; width of pygophore of ♂ more than one

third maximum width of abdomen
. . . . *granulatus* Kormilev
Each anterolateral angle of pronotum with a subcircular, flattened lobe about twice size of the eye; width of pygophore of ♂ less than one third maximum width of abdomen
. . . . *kormilevi*, sp. nov.

Aegisocoris granulatus Kormilev, 1967
(Figs 5Q, 51D-E,G,J-K,M)

Aegisocoris granulatus Kormilev, 1967a: 522 (descr.; figs.); Kormilev & Froeschner, 1987: 96 (listed).

TYPE. Holotype ♀, Cairns dist., A.M. Lea. SAM I20,243. Examined.

MATERIAL EXAMINED. Holotype and 58 specimens: NORTH QUEENSLAND: Upper Plath Rd, 1100m, 2♂, 4♀, 8.ii.1996, GBM; Upper Mulgrave River, 1♂, 26-27.xii.1967, GBM; Bellenden Ker township, 1♂, 7.viii.1966, GBM; Bellenden Ker Ra., 1.5km S Cable Tower 7, 500m, pyrethrum knockdown, 17♂ 7♀, 25-31.x.1981. Earthwatch/QM; Henrietta Ck, Palmerston NP, 1♂ 1♀, 29.xii.1964, GBM, 1♂ 23.iv.1970, GBM; Palmerston NP, 350-400m, 1♀, 2.i.1990, GBM; Palmerston NP, East Margin, 1♂, 1♀, 9.xii.1995, GBM, DJC, GIT; Malanda Falls, 750m, rainforest log litter and fungi, 1♂, 22.vii.1982, S&JP; Millaa Millaa Falls, 2♂ 3♀, 4.xii.1965, GBM; 1♀, 12.viii.1968, BKC, 1♀, 7.xii1989, GBM, GIT, HJ; Bartle Frere track, 17km W. Malanda, 700m, 8♂ 1♀, 8.xii.1988, GBM & GIT; Boonjie, 13km ESE Malanda, 700m, 1♂, 8.xii.1982, GBM, DKY & DJC; Mt Fisher, 7km SW Millaa Millaa, 1050-1100m, pyrethrum knockdown, 1♀, 27-29.iv.1982, GBM,DKY & DJC; Graham Range, 550m, pyrethrum on logs, 1♂, 1♀, 8.xii.ix.1995, GBM, DJC, GIT, in QM. (QM duplicates lodged in BMNH, ANIC, MDPI, UQIC, EH, HNHM.).

DESCRIPTION. Small, 6-7.2mm long, subcircular, reddish, convex, with enlarged pygophore in ♂.

MALE. Head width 1.05 times length, its surface covered with fine granular and with about 6 large granules in 2 rows on vertex; postocular tubercles small, flattened, triangular; eyes large; antenniferous tubercles short, blunt, weakly divergent, extending beyond eyes 1½ times eye diameter; genal processes short, divergent, completely separated on sides of clypeus and barely surpassing its apex. Antennae slender, about 1.2 times length of head; segment II shortest, segments I and II longest, subequal.

Pronotum almost 3 times as wide as long, with scattered granules; submedian elevations complex, each consisting of a smooth, glabrous area sloping into the median sulcus and flanked anteriorly and posteriorly by a pair of prominent, granular tubercles bearing sparse, curled vestiture; anterior pair of tubercles closer together than posterior pair and forming a pair of opposable tubercles across the median sulcus; anterolateral angles of pronotum each with a small, flattened, semicircular, semi-erect lobe about the size of eye; posterolateral pronotal angles each with a small, submarginal granular tubercle. Mesonotal scutellar area highly elevated, smooth, with a pair of elongate, granular elevations on top; mesonotal wing vestiges broad, granular, with lateral margins elevated into a granular tubercle on each side; metanotum laterally with circular, granular areas separated from the median ridge by smooth, polished area. Legs short, contrastingly pale, with femora slightly incrassate.

Abdominal tergal disc broadly and strongly convex, with 4 obtuse peaks in anterior half bearing tufts of curled vestiture; enlarged, shining granules along lateral margins of tergal disc; posterior margins of dorsal connexival plates thick-

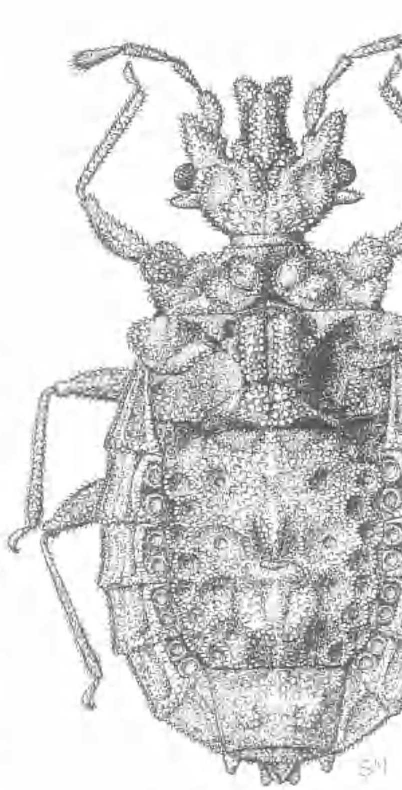

Fig. 50. Dorsal view of ♀ holotype of *Aegisocoris kormilevi*.

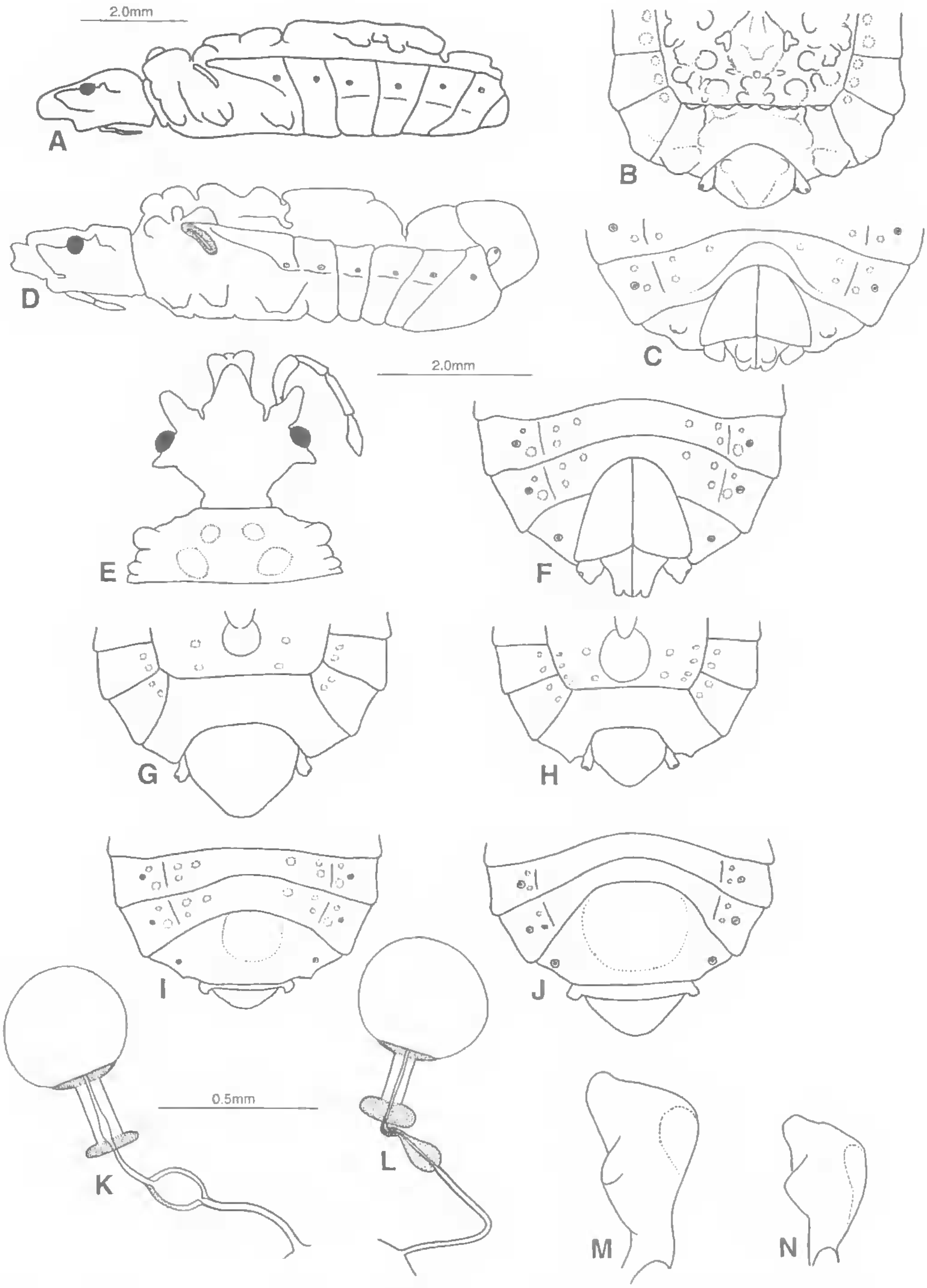

FIG. 51. A-C, *Pseudoargocoris grossi*; A, ♀ lateral view; B, ♂ abdominal apex, dorsal; C, ♀ abdominal apex, ventral. D-N, *Aegisocoris* spp.; D, *A. granulatus*, ♂ lateral view; E, *A. granulatus*, head and prothorax; F-J, abdominal apices, dorsal (d) and ventral (v); F, *A. kormilevi* ♀ v; G, *A. granulatus* ♀ d; H, *A. kormilevi* ♂ d; I, *A. kormilevi* ♂ v; J, *A. granulatus* ♂ v; K-L spermathecae; K, *A. granulatus*; L, *A. kormilevi*; M-N, left parameres, outer view; M, *A. granulatus*; N, *A. kormilevi*.

ened and bearing curled vestiture; paratergites of segment VIII small, inconspicuous, bearing spiracles on mesal side of apex. Pygophore enlarged, width more than 1/3 maximum width of abdomen, with a longitudinal ridge along its dorsum. Parameres as in Fig. 51M. St VII broadly and roundly inflated with central area, smooth, matt-surfaced, contrasting with the coarsely granular lateral areas.
FEMALE. As for ♂ except: Abdominal tergal disc with an inflated area in posterior half, bearing curled vestiture; Tg VII with a pair of widely spaced, low tubercles near hind margin; divided plates of St VII coarsely granular; paratergites of VIII pointed. Spermatheca as in Fig. 51K.

MEASUREMENTS. Holotype ♀ first, then ranges of additional 2♂ and 2♀. L: 7.17, 6.17-6.67, 6.83; W: 3.92, 3.33-3.42, 3.75-3.83; HL: 1.83, 1.56-1.64, 1.67; HW: 1.92, 1.67-1.72, 1.75-1.80; PL: 0.8, 0.76, 0.68-0.72; PW: 2.33, 2.17-2.24, 2.25-2.40; AS: I, 0.56, 0.54-0.56, 0.56-0.6; II, 0.44, 0.36, 0.4; III, 0.56, 0.52-0.54, 0.56; IV, 0.52, 0.48, 0.48-0.52.

DISTRIBUTION (Fig. 52). Rainforests of low to high altitude on the closely adjacent Atherton Tableland, Graham Range and Bellenden Ker Range, N Queensland. The locality of 'Cairns district' of the holotype is further north and has not been confirmed by modern collecting.

REMARKS. This distinctive species occurs on sticks and small logs where it rests in crevices and small depressions. Its highly inflated and tubercular dorsum provide effective camouflage. *A. granulatus* is closely related to the new species described below which occurs north of its range.

Aegisocoris kormilevi sp. nov.
(Figs 4L, 50, 51F,H-I,L,N)

TYPE. Holotype ♀, Churchill Ck, Mt Lewis Road, via Julatten, N Qld., 27.xi.1964, G. Monteith. QMT11676.

MATERIAL EXAMINED. Holotype and 32 paratypes: NORTH QUEENSLAND: Mt Halcyon, 870m, 1♂, 22-24.xi.1993, GBM, DJC, LR, HJ; 3.5km W Cape Tribulation, 680m, pyrethrum knockdown, 1♂, 2.x.1982, GBM, DKY & GIT; Stewart Ck, 4km NNE Mt Spurgeon, 1250-1300m, 15-20.x.1991, GBM,DJC,LR,HJ; 7km N Mt Spurgeon, 1200-1250m, 6♂, 6♀, 17-19.x.1991, GBM,DJC,LR,HJ; Mossman Bluff track, 1000m, 2♀, 17-19.xii.1988, GBM & GIT, 1100-1300m, 1♀, 17-18.xii.1988, GBM & GIT; 2.5km N Mt Lewis, 1040 m, 1♂ 1♀, 3.xi.1983, DKY & GIT; 10km N Mt Lewis, 1100m. 1♂, 1♀, 25.xi.1990. GBM,

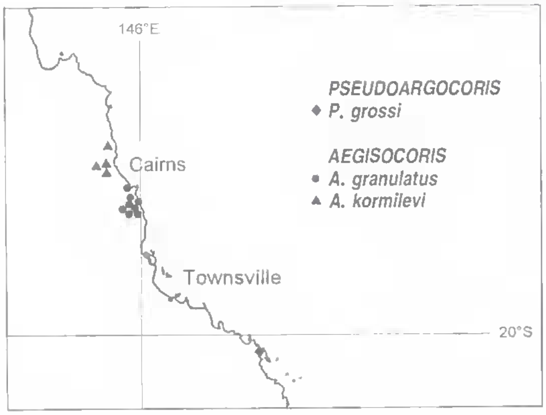

FIG. 52. Records of *Pseudoargocoris* and *Aegisocoris* species in northern Queensland.

DJC, GIT, RS, HJ; Churchill Ck, Mt Lewis Road, via Julatten, 6♂ 3♀, 27.xi.1964, GBM, in QM. (QM duplicates lodged in BMNH, ANIC, SAM, EH, NMNH, UQIC) (paratypes: QMT14000-14019, QMT14025-14029).

DESCRIPTION. Small, 6-7.50mm long, elongate-oval, reddish, convex, with pygophore of normal proportions. Closely related to the type species but differing as follows: Body form more elongate; head with large granules on posterior dorsum of head not in 2 rows; pronotum with antero-lateral lobes much larger than eye, directed laterally, not semi-erect; scutellar elevation of mesonotum lower, with narrower median sulcus; abdominal tergal disc less inflated; ♂ with pygophore not enlarged, its width less than 1/3 maximum width of abdomen; dorsum of pygophore evenly convex, without median ridge. Parameres as in Fig. 51N. Spermatheca as in Fig. 51L.

MEASUREMENTS. Holotype ♀ first, then ranges of additional 2♂ and 2♀. L: 6.67, 6.0, 6.5-7.5; W: 3.5, 2.92-3.08, 3.42-4.08; HL: 1.6, 1.52, 1.6-1.8; HW: 1.8, 1.6, 1.76-1.88; PL: 0.68, 0.72-0.68, 0.72-0.8; PW: 2.32, 2.08, 2.32-2.60; AS: I, 0.56, 0.48-0.52, 0.52-0.58; II, 0.36, 0.34, 0.38; III, 0.5, 0.5, 0.50-0.52; IV, 0.52, 0.48-0.50, 0.46-0.54.

DISTRIBUTION (Fig. 52). Rainforest at moderate to high altitude from Cape Tribulation to the Carbine Tableland, N Queensland.

REMARKS. The two species of *Aegisocoris* recognized here are allopatric segregates of a former widespread species. The several collections of *A. kormilevi* however are uniform in the characters used to separate them from *A. granulatus*. The differential size in the pygophore of the 2 species is striking.

The new species is named for Nicholas A. Kormilev, who described the genus and so many other Aradidae around the world.

Neophloeobia Usinger & Matsuda, 1959

Neophloeobia Usinger & Matsuda, 1959: 232 (descr.); Kormilev, 1967a: 523 (comments on definition); Kormilev, 1971: 7 (incl. in key); Kormilev & Froeschner, 1987: 163 (catalogue of spp.).
Scirrhocoris Kormilev, 1965a:26 (descr.); Kormilev, 1971: 6 (incl. in key); Kormilev & Froeschner, 1987: 191 (catalogue of spp.) *syn. nov.*
Schirrhocoris: Kormilev, 1965a: 27 (incorrect spelling for *Scirrhocoris*).

TYPE-SPECIES. Of *Neophloeobia*: *Neophloeobia montrouzieri* Usinger & Matsuda, 1959, by original designation.
Of *Scirrhocoris*: *Woodwardiessa australiensis* Kormilev, 1964 by original designation.

DESCRIPTION. Small to medium-sized, apterous, with bicoloured legs and flattened appearance.

Head generally longer than broad; postocular tubercles present, forming narrow, acutely pointed, conical or cylindrical processes; eyes sessile or moderately exserted; antenniferous tubercles well-developed, usually divergent; genae long, fused in front of clypeal apex; rostral groove closed posteriorly; rostral atrium closed. Antennae with segments II and III of lesser diameter than that of I and IV; antennal segment III usually longer than II.

Pronotum with a median, longitudinal sulcus and without prominent elevations in either submedian or sublateral positions; anterolateral angles of pronotum with explanate lobes whose outer margins are continuous posteriorly to posterolateral angles; pronotal collar, delimited by a dorsal furrow, and bearing dorsal and ventral opposable tubercles; posterior pronotal margin bordered except at lateral extremities. Scutellar region of mesonotum elevated and subcontinuous posteriorly to the first abdominal tergum; neither mesonotum nor metanotum with distinct elevations laterad of median ridge; opposable tubercles absent from meso- and metanota except occasionally small tubercles subtended towards anterior angles of median plate of abdominal Tg I. Legs with tibiae and femora bicoloured. Tarsal pulvilli present, spatulate.

Fused abdominal tergal disc never inflated; pattern of glabrous areas distinct and marked by ridges; median portion of Tg III usually forming a slightly elevated, trapezoidal or hexagonal area reaching posteriorly to tubercle of nymphal scent gland scar; suture between abdominal Tg I and II distinct medially and obliterated laterally; opposable tubercles present between Tg I and II; margins of Cx IV angled in ♂, and usually also in ♀.

Median impressions not distinct on meso- and metasterna; pattern of glabrous areas prominently impressed on abdominal sterna.

Spermatheca and its duct not modified. Parameres with a row of fine teeth on their inner face.

DISTRIBUTION (Fig. 10E). An Australian endemic along the east coast from Cooktown to N N.S.W.

REMARKS. Previously 3 species were attributed to *Neophloeobia*, viz. *montrouzieri* (type), *australica* and *tuberculata*. Analysis of the 14 species now known to be allied shows that 3 generic groups can be recognized, each including one of the three species originally in *Neophloeobia*: 1, *Neophloeobia*, based on *N. montrouzieri*; 2, *Mesophloeobia* gen. nov., including *N. australica*; 3, *Granulaptera* gen. nov., including *N. tuberculata*.

Scirrhocoris, which Kormilev based on *Woodwardiessa australiensis* and in which he later included *Scirrhocoris mirabilis*, has been found to be synonymous with *Neophloeobia*.

The species here included in *Neophloeobia* occur as an allopatric series from N N.S.W. to tropical N Queensland. They fall into 3 well defined groups: the southern *montrouzieri-australiensis-mirabilis* group, the central *incisa-paluma-cataracta* group, and the taxonomically isolated northern species, *elongata*. *N. bulburina* is intermediate between the southern and central groups as discussed later.

KEY TO THE SPECIES OF *NEOPHLOEOBIA*

1. Male with St VI not narrowed in middle by forward extension of St VII; ♂ St VII usually without a median, polished callosity; ♀ with median length of St VII longer than combined length of St V and VI; cleft between eye and antenniferous tubercle deep, extending beyond inner margin of eye 2
   Male with St VI narrowed in midline by angulate forward extension of St VII; male usually with a median, raised, polished, callosity on St VII; ♀

with median length of St VII not longer than combined length of V and VI; cleft between eye and antenniferous tubercle usually shallow, largely occluded 5

2(1). Femora and tibiae not bicoloured; antenniferous tubercles and genal processes usually acutely pointed; pattern of glabrous areas not deeply impressed on abdominal sterna; total head-body length at least twice maximum width (North Queensland) . . . . . *elongata*, sp. nov.

Femora and tibiae dark with pale bands; antenniferous tubercles and genal processes apically blunt; pattern of glabrous areas deeply impressed on sterna; total head-body length less than twice maximum width (South Queensland and Northern New South Wales) 3

3(2). Sides of abdomen concave so that width across segment VI is greater than width across segment V; antennal segment III with erect setae as long as its diameter . . . . *australiensis* (Kormilev)

Sides of abdomen not concave, width across segment VI less than width of segment V; antennal segment III with short, adpressed setae 4

4(3). Femora and tibiae with, long, erect setae over whole surface; male with a small, elongate, polished callosity on midline of St VII (New South Wales) . . . *montrouzieri* Usinger & Matsuda

Setae of legs short and adpressed, with a few erect setae on distal half of tibiae; male without a polished callosity on St VII (Queensland) . . . . *mirabilis* (Kormilev)

5(1). Front half of median portion of abdominal tergal disc forming a raised, flat, more or less hexagonal area, of which the middle of tergum II is smooth . . . . *bulburina*, sp. nov.

Front half of median portion of abdominal tergal disc not uniformly flat and raised; middle of tergum II raised, coarsely tubercular, semi-confluent with similar tubercular portion of tergum I . . . 6

6(5). Sublateral elevations of pronotum distinct and slightly higher than lateral pronotal margins; male with suture between St VI and VII strongly angulate anteriorly so that St VI is almost bisected medially; male with Cx margins of VI weakly produced . . . . *incisa*, sp. nov.

Sublateral elevations of pronotum absent, or much lower than pronotal margins; male with St VI narrowed, but not almost bisected; male with Cx margins of VI acutely angulate 7

7(6). Pronotum with lateral margins flattened and reflexed; ♀ with margins of Cx VI and VII angulately lobed . . . . *paluma*, sp. nov.

Pronotum with lateral margins not flattened and reflexed; ♀ with margin of Cx VI not lobed, that of VII weakly so . . . . . . *cataracta*, sp. nov.

Neophloeobia montrouzieri Usinger & Matsuda, 1959 (Figs 7F, 53F,L,O,V, 54E,L,R)

Neophloeobia montrouzieri Usinger & Matsuda, 1959: 234 (descr., fig.); Kormilev, 1965a: 26 (misident. of *Mesophloeobia vetusta*, sp. nov.); Kormilev, 1967a: 524, (misident. of *Mesophloeobia vetusta*, sp. nov.); Kumar, 1967: 21-24 (internal anatomy); Kormilev & Froeschner, 1987: 163 (listed).

TYPE. Holotype ♂, N. Dorrigo, Australia, x.10, S.F.I. Helms Coll., in BPBM. Type not examined but good condition and label data confirmed by Gordon M. Nishida.

MATERIAL EXAMINED. 84 specimens: NEW SOUTH WALES: Barrington House, via Salisbury, 5♂ 2♀, 8-11.ii.1965, GBM, 1♂, 14.viii.1970, GBM; Mt Allyn, Barrington Tops, 2♂, 1♀, 8.i.1967, GBM; Chichester SF, via Dungog, 1♀, 23.xi.1989, J. Stanisic & D. Potter; 3km N Lansdowne, via Taree, 1♀, 2.vi.1990, G.A. Williams; 'Wingham Brush', Wingham, 3♂ 4♀, 15.viii.1970, GBM, 1♀, 21.xi.1989, J. Stanisic & D. Potter; Carrai Plateau, via Kempsey, 3♀, 3-5.i.1967, GBM, 1♂ 1♀, 14-15.iv.1968, GBM; Bellbrook, via Kempsey, 3♂ 1♀, 2.i.1967, GBM, in QM; New England NP, 4,700', ANIC Berl. 56, 1♀, 2.ii.1968, R.W. Taylor, in ANIC; Styx R., 15km SSW Ebor, 1♂ 1♀, 14.xii.1984, DKY, in UQIC; New England NP, 3♀, 22-23.i.1966, B. Cantrell, 4♂ 1♀, 22-23.i.1966, TAW, 2♂ 1♀, 30.xii.1973, GBM in QM; Dorrigo NP, 4♂ 6♀, 19.xi.1979, D. Doolan, 1♀, 10.x.1977, D. Doolan, 2♂ 3♀, 29.ix.1979, in AM, 1♀, 27.i.1966, TAW, 1♂, 9-10.iv.1966, TAW, 2♂ 3♀, 10.iv.1966, GBM; Bruxner Park, via Coffs Harbour, 3♂ 1♀, 16.viii.1970, GBM, 1♂, 25.ii.1967, GBM, 2♂ 1♀, 16.iv.1968, GMB; Wilson River Reserve, via Wauchope, 240m, 4♂ 3♀ 2N, 13.i.1986, GBM; Mt Banda Banda, via Wauchope, 1100m, 1♂, 13.i.1986, GBM; Lorne SF, SW Wauchope, 1♀, 18.i.1995, Stanisic & Chaseling, in QM. (QM duplicates lodged in BMNH, DJ, SAM, EH, NMNH, HNHM).

DESCRIPTION. Medium sized, 6.1-9.7mm long, broad, depressed, brown, with truncate hind body and setose legs.

MALE. Head length 1.1-1.2 times width, its dorsum with dense vestiture of straight setae and with an irregular, double row of granules on posterior half; postocular tubercles slender, curving posteriorly, often surpassing outer profile of eyes; eyes small, stylate, cleft between them and antenniferous tubercles deep and wide; antenniferous tubercles granular, blunt apically, bent; genal processes flattened, granular, expanded laterally before blunt apices. Antennae short, about 1.1. times head length; segment II shortest, slightly more than half length of III; setae on II and III short, inconspicuous.

Pronotum about 2.6 times as wide as long; hind margin convex posteriorly in middle, distinctly bordered; lateral margins flattened and reflexed dorsally; submedian elevations forming conical tubercles bearing setae. Mesonotum with scutellar region moderately raised, granular, continuous posteriorly to abdominal Tg I; lateral areas of mesonotum flat, with large sparse granules. Metanotum with low sublateral elevations separated from median ridge by glabrous region on each side. Legs with long, erect setae on femora and tibiae; colour irregularly bicoloured, femora dark with pale median rings, tibiae pale with faint dark rings.

Abdominal tergal disc with middle of anterior half with a transverse, rhomboidal, raised area containing the glabrous areas of Tg II which are divided into 2; scent gland scar a raised tubercle; a pair of weak opposable tubercles across suture between Tg I and II; sides of abdomen subparallel; margins of Cx VII bluntly angulate; paratergites of VIII subcylindrical, with spiracles displaced laterally. Glabrous area pattern of sterna strongly impressed; midline of St II to VI with median impressions; St VII with a small, elongate, polished median callosity on anterior half. Parameres as in Fig. 54L.

FEMALE. As for ♂ except: abdominal tergal disc with pattern of glabrous areas more coarsely imprinted; Tg VII quadrately raised, with a pair of transverse, posterior tubercles; paratergites of VIII blunt; median length of St VII longer than that of V and VI combined. Spermatheca simple, with short duct (Fig. 54R).

MEASUREMENTS. Ranges of two ♂ and two ♀. L: 6.17-6.67, 8.5-9.67; W: 3.16-3.25, 4.17-4.33; HL: 1.6-1.92, 2.08-2.12; HW: 1.6, 1.88-1.92; PL: 0.8, 0.88-0.96; PW: 2.08-2.12, 2.52-2.56; AS: I, 0.56-0.66, 0.68-0.70, II, 0.28-0.38, 0.38 III, 0.60-0.66, 0.64-0.76, IV, 0.44-0.5, 0.54-0.56.

DISTRIBUTION (Fig. 56). Common in rainforests at high and low altitudes in N.S.W. from Barrington Tops to the Dorrigo region. Queensland localities of Tamborine and Lamington (Kormilev, 1965a, 1967a) are incorrect, being based on misidentified *Mesophloeobia vetusta* sp. nov.

REMARKS. *N. montrouzieri* is the southernmost species in its genus and shares with *Mesophloeobia australica* the distinction of being the southernmost apterous mezirine in Australia. It occurs gregariously on sticks and small logs in rainforests from lowlands to temperate *Nothofagus* forest at 1,500 metres near Ebor. It has a close superficial resemblance to the even more common *Mesophloeobia vetusta*, with which it has a narrow sympatric overlap in the Dorrigo region. The 2 species were confused by Kormilev as pointed out above and it is probable that the species whose internal anatomy was studied by Kumar (1967) as *N. montrouzieri* was also *M. vetusta* since most of Kumar's material came from southern Queensland where *N. montrouzieri* does not occur. The species are easily separated by the simpler prothorax and the lack of the rhomboidal elevation on the base of the tergal disc in *M. vetusta*.

Neophloeobia australiensis (Kormilev, 1964) *comb. nov.* (Figs 53A,M,U, 54G,I,Q)

Woodwardiessa australiensis Kormilev, 1964: 27 (descr., fig.).
Scirrhocoris australiensis: Kormilev, 1965a: 26 (descr. of ♂); Kormilev & Froeschner, 1987: 191 (listed).

TYPE. Holotype ♀, Cunningham's Gap, June, 1960, J.B. Stephens, QMT6210. Examined.

MATERIAL EXAMINED. Holotype and 136 specimens: SOUTH QUEENSLAND: Mistake Mountains, via Laidley, 3,000-3,500'; Bare Rock, 2km N Mt Cordeaux; Cunningham's Gap; Mt Mitchell; Spicers Peak, 1200m; Mt Asplenium, 1290m; Bald Mountain area, 3,000-4,000', via Emu Vale, GBM; Mt Superbus, via Boonah; 'The Head', via Boonah; Nothofagus Mtn, 1200m; Lever's Plateau, via Rathdowney; Mt Chinghee, 12km SE Rathdowney, 720m; Mt Gipps, 750m; Lamington NP; Tamborine Mountain; 4 ml. S of Canungra, 1000'. NEW SOUTH WALES: Mt Clunie, 2000'; Mt Glennie, 16km E Woodenbong, 900m; Tooloom Plateau, via Urbenville; Richmond Gap, via Grevillea; Wiangaree SF, Via Kyogle, in QM. (QM duplicates lodged in BMNH, DJ, SAM, EH, NMNH, NRS, HNHM, MNHG, UQIC).

DESCRIPTION. Medium-sized, 6.6-8.7mm long, quadrate, depressed, with smooth dorsal surface and concave abdominal margins.

MALE. Head length 1.2-1.3 times width, its dorsum rather smooth, with sparse vestiture of curled setae and a double row of reduced granules on vertex; postocular tubercles slender, curved posteriorly, usually surpassing outer profile of eyes; eyes weakly exserted, cleft between them and antenniferous tubercles deep but narrow; antenniferous tubercles divergent, straight, blunt, extending beyond eyes by distance equalling twice eye diameter; genal processes long, parallel-sided, with blunt apices. Antennae 1.3-1.4 times head length; segment III longest, twice length of II.

Pronotum much narrower than hindbody, width 2.8 times length, with lateral margins strongly converging anteriorly; laterally with weakly explanate, reflexed margins; submedian areas depressed, with glabrous disc usually large; sublateral areas with a weak, longitudinal ridge; hind pronotal margin convex posteriorly, margined. Mesonotum with scutellar region barely elevated, granular, sublateral areas granular; metanotum with sublateral areas weakly elevated. Legs occasionally with sparse erect setae, best developed near tibial apices; bicoloured, each femur with two pale rings, each tibia usually with basal and median pale rings.

Abdominal tergal disc largely depressed, with pattern of ridges inconspicuous; a rhomboidal area weakly defined in region of inner glabrous areas of segment III, the latter being subdivided; scent gland scar depressed; a pair of opposable tubercles across suture between segment I and II on each side; Cx of segment II broad, extending laterally beyond profile of other Cx; sides of abdomen concave in region of Cx III, IV and V and markedly widening at Cx VI; Cx margin on VII weakly angled; paratergites of VIII subcylindrical, with apices truncate and spiracles displaced slightly laterally; St VII without a median, polished callosity; midline of St III-VI with weak median impressions. Parameres as in Fig. 54I.

FEMALE. As for ♂ except: abdomen with lateral margins less concave; abdominal tergal disc with rhomboidal anterior area usually more clearly defined; Tg VII quadrately raised, with a pair of transverse, posterior tubercles; paratergites of VIII reduced, blunt; median length of St VII longer than that of V and VI combined. Spermatheca simple, duct short with proximal region thickened (Fig. 54Q).

MEASUREMENTS. Holotype ♀ first, then ranges of additional 2♂ and 2♀. L: 8.67, 6.67-6.83, 8.17-8.67; W: 4.42, 3.42, 4.33-4.42; HL: 2.08, 1.84-1.92, 1.88-2.16; HW: 1.80, 1.44-1.52, 1.56-1.68; PL: 0.92, 0.72-0.80, 0.80-1.0; PW: 2.52, 2.04-2.28, 2.24-2.48; AS: I, 0.70, 0.64-0.68, 0.64-0.70; II, 0.50, 0.38-0.42, 0.44-0.46; III, 1.0, 0.78-0.88, 0.9-0.96; IV, 0.64, 0.64- 0.60, 0.62-0.70.

DISTRIBUTION (Fig. 56). Macpherson Range on the border between Queensland and N.S.W. including Tamborine to the north and Tooloom Plateau to the south. It also spreads on to the Great Dividing Range proper where it occurs as far north as the Mistake Mountains, slightly north of the type locality of Cunningham's Gap.

REMARKS. After first placing it in *Woodwardiessa* Kormilev later (1965a) made this species the type *Scirrhocoris*. Its flat form, broad connexiva of segment II and concave abdominal margins give it a distinctive appearance but closer examination shows this to be due to superficial modification of a typical member of the *Neophloeobia* group. The species is constant throughout its range and is geographically discrete from its closely adjacent congeners, *N. montrouzieri* and *N. mirabilis*.

Neophloeobia mirabilis (Kormilev, 1965) *comb. nov.* (Figs 53G,I, 54B-C,P,N)

'*Schirrhocoris*' *mirabilis* Kormilev, 1965a: 27, (descr. under misspelt generic name);
Scirrhocoris mirabilis: Kumar, 1967: 21-24 (internal anatomy); Kormilev & Froeschner, 1987: 192 (listed).

TYPE. Holotype ♂, Highvale, Qld., 15.ix.1964, G. Monteith, QMT6326. Examined.

MATERIAL EXAMINED. Holotype and 33 specimens: SOUTH QUEENSLAND: Mt Bauple, via Maryborough, 1♂, 6.xii.1966, GBM; 2♂, 13.xii.1965; Cooran Tableland, via Gympie, 1,300', 4♂ 2♀, 10-11.iii.1972, GMB; Imbil, 6♂ 3♀, 6.xii.1966, GBM; Kenilworth SF, 1♂ 1♀, 5.xii.1966, GBM; Little Yabba Creek, via Kenilworth, 1♂, 11.ii.1973, I. Naumann; Mt Mee SF, 1♂, 20.ii.1965, GBM, 1♂, 31.x.1978, GBM; Neurum Ck, Mt Mee, 1♀, 28.ii.1979, GBM; Mt Glorious, 1♀, 13.ix.1966, GBM, 1♀, 9.i.1972, GBM, 1♂, 19.ix.1964, in QM; Maiala NP, Mt Glorious, ANIC Berl. 451, rainforest, 1♀, 13.iii.1973, R.W. Taylor, in ANIC; Highvale, via Samford, ♀ allotype QMT26499, 1♂ 1♀, 15.ix.1964, GBM, in QM, 1♂ 1♀, 15.ix.1964, GBM, in ANIC, 1♀, 28.ii.1965, GBM, in QM. (QM duplicates lodged in BMNH, SAM, EH, UQIC).

DESCRIPTION. Small, 5.5-7.5mm long, oval, with broad, blunt genal processes and scalloped abdominal margins.

MALE. Head length 1.05 times width, its dorsum with dense, curled setae; posterior half with patch of large granules, sometimes in two rows; postocular tubercles straight, barely reaching outer profile of eyes; eyes moderately stylate with wide, deep cleft between them and antenniferous tubercles; antenniferous tubercles short, blunt, extending beyond eyes by a distance equal to

1½ eye diameters; genal processes flat, very broad before apex, blunt. Antennae slender, about 1.3-1.4 times head length; segment III longest, a little less than twice length of II.

Pronotum 2.5-3 times as wide as long; sides narrowing anteriorly, with margins explanate and reflexed; submedian areas with low, seta-bearing tubercles; sublateral areas each with a faint, granular ridge; hind border of pronotum convex posteriorly, bordered. Mesonotum with scutellar region raised into a median, granular ridge continuous posteriorly to abdominal Tg I; sublateral regions of metanotum each with a circular depression open posteriorly to the vicinity of the opposable tubercles across the suture between Tg I and II. Legs with short, adpressed setae except a few erect setae near apices of tibiae; legs bicoloured, each femur dark with a narrow pale ring, each tibia with basal and subapical pale rings.

Abdominal tergal disc with pattern of glabrous areas distinct; a rhomboidal, raised area on anterior half which includes the inner glabrous areas of segment III, the latter being subdivided; scent gland scar a small tubercle; Cx margins of segment III-IV concave, giving sides of abdomen a scalloped appearance; Cx VII angulate; paratergites of VIII subcylindrical, obliquely truncate apically, spiracles slightly displaced laterally. Abdominal St with strongly impressed glabrous area pattern; St III-VI with median depressions; St VII without a median, polished callosity. Parameres as in Fig. 54N.

FEMALE. As for ♂ except: abdominal tergal disc with patterns more strongly impressed; rhomboidal area on anterior half more raised, usually glabrous and contrastingly pale; Tg VII with quadrate median elevation bearing a pair of prominent, subcontiguous, transverse, posterior tubercles; median length of St VII longer than that of V and VI combined. Spermatheca simple, its duct short, slightly dilated (Fig. 54P).

MEASUREMENTS. Holotype ♂ first, then ranges of additional 2♂ and 2♀. L: 6.50, 5.58-5.75, 6.17-7.50; W: 3.50, 3.08, 3.58-4.58; HL: 1.60, 1.32-1.52, 1.68-1.8; HW: 1.52, 1.36-1.44, 1.44-1.64; PL: 0.8, 0.72-0.8, 0.8-0.96; PW: 2.08, 1.72-1.88, 1.92-2.28; AS: I, 0.54, 0.5, 0.54-0.6; II, 0.38, 0.34-0.36, 0.36-0.44; III, 0.72, 0.6-0.64, 0.64-0.78; IV, 0.44, 0.44, 0.46-0.54.

DISTRIBUTION (Fig. 56). Rainforests of low to moderate altitude in the coastal range of S Queensland from near Brisbane north to Mt Bauple near Maryborough.

REMARKS. *N. mirabilis* forms, with *N. montrouzieri* and *N. australiensis*, a group of 3 related, though very distinct species of *Neophloeobia* which occupy strictly allopatric, but adjacent, rainforest distributions in N NSW and S Queensland. In many respects *N. mirabilis* and *N. montrouzieri* are more similar to each other than to *N. australiensis* which occurs between them. Since both *N. mirabilis* and *N. montrouzieri* tolerate lower altitudes than *N. australiensis* they may be relicts of a once more widespread species from which originated *N. australiensis* as a specialized high altitude form on the Lamington-Macpherson massif.

Neophloeobia bulburina sp. nov.
(Figs 53E,S, 54H)

TYPE. Holotype ♂, Bulburin SF, 9km E Many Peaks, 600m, C.Qld., 17 Sept 1989, G.B. Monteith, QMT11832.

MATERIAL EXAMINED. Holotype and 8 paratypes: SOUTH QUEENSLAND: Bulburin SF, 9km E Many Peaks, 5♂ 1♀, 17.ix.1989, GBM; Granite Creek, 700', Bulburin SF, via Many Peaks, 1♀, 7.iv.1972, GBM; Mt Fort William, 700m, 6km NE Kalpowar, 1♂, 18.ix.1989, GBM,, in QM. (QM duplicate lodged in BMNH) (paratypes: QMT29868-29874).

DESCRIPTION. Very small, 5.6-7.4mm long, broad, with narrowed St VI in the ♂, with raised trapezoidal plate on tergal disc.

MALE. Head length 1.04-1.16 times width; dorsum with sparse setae, its vertex with irregular double row of granules; postocular tubercles narrow, straight, pointed, reaching to a little beyond the outer profile of eyes; eyes somewhat exserted, separated from antenniferous tubercles by a deep cleft; antenniferous tubercles straight, tapering, subacute apically, extending beyond eye by about 1.5 eye diameters; genal processes flattened, apices separate, rather blunt, reaching to just beyond apex of first antennal segment. Antennae long, slender, about 1.4 times head length; segment III longest, II shortest.

Pronotum about 2.6-2.9 times as wide as long, sides converging anteriorly; margins weakly explanate, not reflexed; hind border convex, weakly margined. Submedian elevations raised, sublateral elevations almost absent. Mesonotum with scutellar region raised and granular, running posteriorly to join with elevated abdominal Tg I.

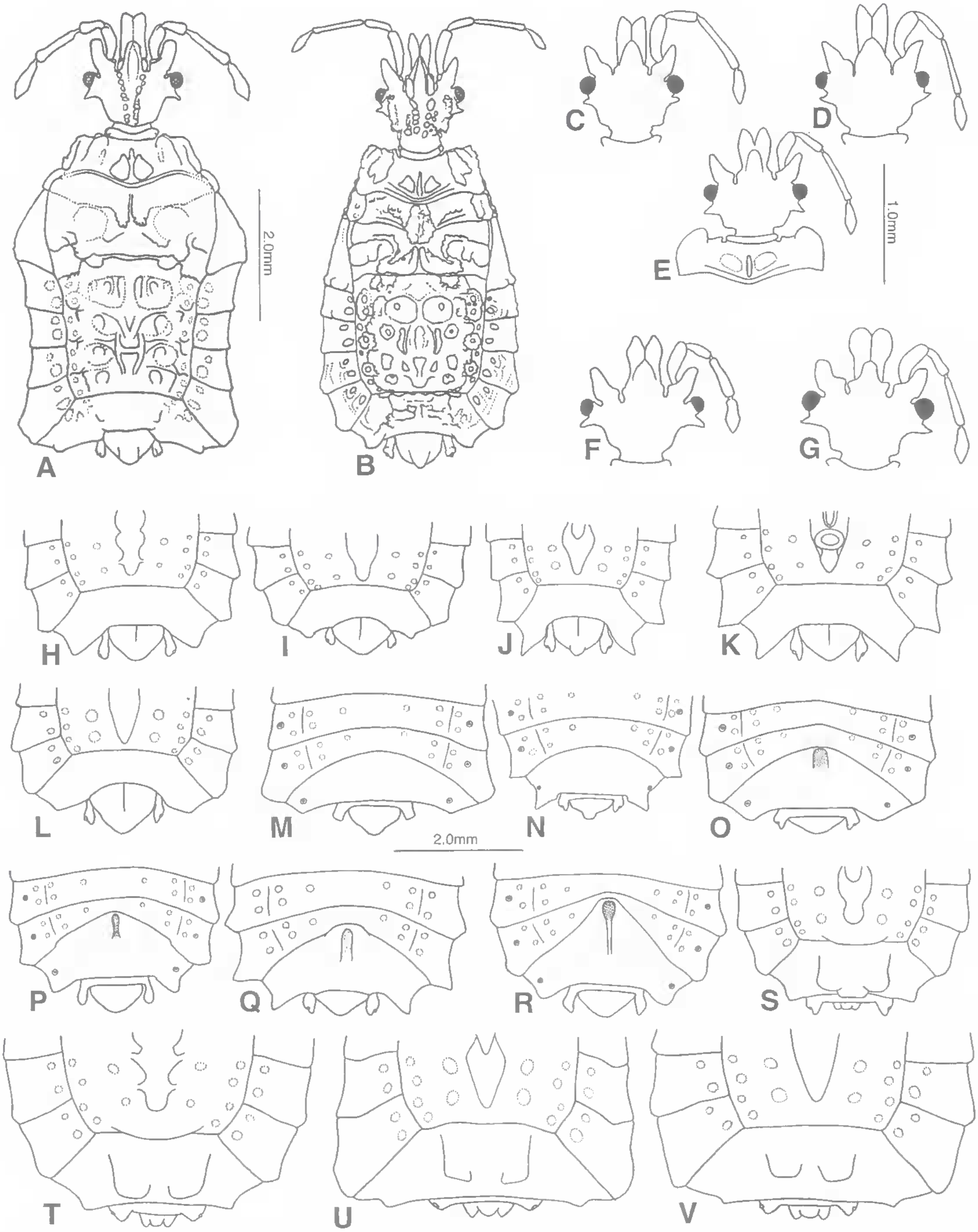

FIG. 53. *Neophloeobia* spp.; A, *N. australiensis* ♂; B, *N. incisa* ♂; C, *N. cataracta*; D, *N. paluma*; E, *N. bulburina*; F, *N. montrouzieri*; G, *N. mirabilis*; H-V, abdominal apices, dorsal (d) and ventral (v); H, *N. cataracta* ♂ d; I, *N. mirabilis* ♂ d; J, *N. elongata* ♂ d; K, *N. paluma* ♂ d; L, *N. montrouzieri* ♂ d; M, *N. australiensis* ♂ v; N, *N. elongata* ♂ v; O, *N. montrouzieri* ♂ v; P, *N. cataracta* ♂ v; Q, *N. paluma* ♂ v; R, *N. incisa* ♂ v; S, *N. bulburina* ♀ d; T, *N. cataracta* ♀ d; U, *N. australiensis* ♀ d; V, *N. montrouzieri* ♀ d.

Metanotum with shallow glabrous channels between median ridge and granular, sublateral swellings. Legs with sparse, adpressed setae except for erect setae on distal half of tibiae; legs strongly bicoloured with pale coxae, a wide pale band on each femur and with subbasal and apical pale rings on tibiae.

Abdominal tergal disc with a large hexagonal (trapezoidal), smooth, raised elevation occupying anterior half; large, undivided, inner glabrous areas of Tg III included on this elevation. Scent gland scar pale with a median, dark, anterior tubercle. Connexival plates with pale semicircular patterns usually evident; Cx II narrow, elongate; lateral margins of Cx V and VI weakly lobed posteriorly, that of VII with a prominent, blunt angulation; paratergites of VIII clavate, apices oblique. Abdominal St II-V with shallow median depressions; suture beteween St VI and St VII angled anteriorly so that median width of St VI is narrowed to half width of St V. Patterns of ventral glabrous areas wekly impressed on sterna.

FEMALE. As for ♂ except: abdominal tergal disc elevated posteriorly, the elvation overhanging suture between Tg VI and VII; Tg VII with a quadrate elevation depressed in centre. Paratergites of VIII small, pointed. Median length of St VII shorter than length of St V and VI combined.

MEASUREMENTS. Holotype ♂ first, then range of 2♂ and 2♀ paratypes. L: 5.83, 5.66-6.08, 6.17-7.33; W: 2.75, 2.63-2.87, 3.16-3.75; HL: 1.47, 1.46-1.62, 1.52-1.81; HW: 1.41, 1.31-1.41,1.36-1.56; PL: 0.72, 0.62-0.66, 0.68-0.78; PW: 1.87, 1.78-1.97, 1.96-2.34; AS: I, 0.47, 0.50-0.53, 0.56-0.60; II, 0.37, 0.38, 0.42-0.44; III, 0.75,0.69- 0.71, 0.80-0.81; IV, 0.47, 0.42-0.46, 0.44-0.50.

DISTRIBUTION (Fig. 56). Two nearby rainforest systems in the Dawes Range of S central Queensland. Surprisingly it is not known at nearby Kroombit Tops which has been intensively collected.

REMARKS. This species is from a locality midway between the range of the southern *montrouzieri-australiensis-mirabilis* group and the northern *incisa-paluma-cataracta* group and shows some intermediate features. The prominent trapezoidal elevation at the base of the abdominal tergal disc and the large eye clefts agree with the southern species, while the short St VII in the ♀ and narrowed St VI in the ♂ agree with the northern species. *N. bulburina* is the smallest member of its genus.

Neophloeobia incisa sp. nov.
(Figs 53B,R, 54O)

TYPE. Holotype ♂, Eungella Nat. Park, Qld., 18.iv.1968, G. Monteith, QMT11677.

MATERIAL EXAMINED. Holotype and 31 paratypes: CENTRAL QUEENSLAND: Eungella NP, 1♂, 19.iv.1968, BKC, 1♂, 2.i.1965, GBM, 2♂, 10.xii.1965, GBM, Palm Lookout, QM Berl 32, 5♂, 18.iv.1979, GBM, Dalrymple Heights, QM Berl 39, 1♂, 19.iv.1979, GBM, in QM, nr School, 3♂, 9.v.1980, I.D. Naumann & J.C. Cardale, in ANIC; Eungella NP, Upper Cattle Ck, 900m, 1♂, 17.xi.1992, GBM, GIT, DJC & HJ; Finch Hatton Gorge, via Finch Hatton, 2♂, 6.viii.1966, GBM; Mt Macartney, Cathu SF (20.51S X 148.33E), QM Berl. 43, 750m, 1♂, 20.iv.1979, GBM, QM Berl. 46, 700-800m, 3♂ 1♀, 21.iv.1979, GBM, QM Berl. 49, 690m, 1♂, 21.iv.1979, GBM, QM Berl 54, 750m, 1♂, 22.iv.1979, GBM, 3♂ 1♀, 19.xi.1992, GBM, GIT, DJC & HJ; Springcliffe, 2♂, 12.i.1965, J.E. Dunwoody; Cannonvale, QM Berl 64, 1♂, 25.iv.1979, GBM; Mt Dryander, 500-600m, QM Berl 59, 1♂, 24.iv.1979, GBM, in QM. (QM duplicates lodged in BMNH, EH, NMNH, UQIC) (paratypes: QMT29875-29901).

DESCRIPTION. Small 6.3-8.1mm, elongate, with abdominal St VI deeply bisected by St VII in the ♂.

MALE. Head elongate, 1.2-1.38 times as long as wide; dorsum with sparse vestiture of curled setae, its vertex with a double row of crowded granules; postocular tubercles small, straight, directed at right angles to head, often not reaching outer profile of eyes; eyes sessile, separated from antenniferous tubercles by a shallow cleft; antenniferous tubercles straight, tapering, subacute apically, extending beyond eyes by slightly more than twice eye diameter; genal processes long, flattened, apices separate, subacute. Antennae long, slender, about 1.4 times head length; segment III longest.

Pronotum about 2.5 times as wide as long, sides narrowing slightly anteriorly; margins weakly explanate, not reflexed; hind border weakly convex posteriorly, margined. Mesonotum with scutellar region forming a depressed ridge running posteriorly to abdominal Tg I. Metanotum with smooth, glabrous channels between median ridge and granular, sublateral swellings; the latter with oval depressions which open posteriorly to vicinity of opposable tubercles spanning the suture between Tg I and II. Legs with sparse, adpressed setae except for a few erect setae near tibial

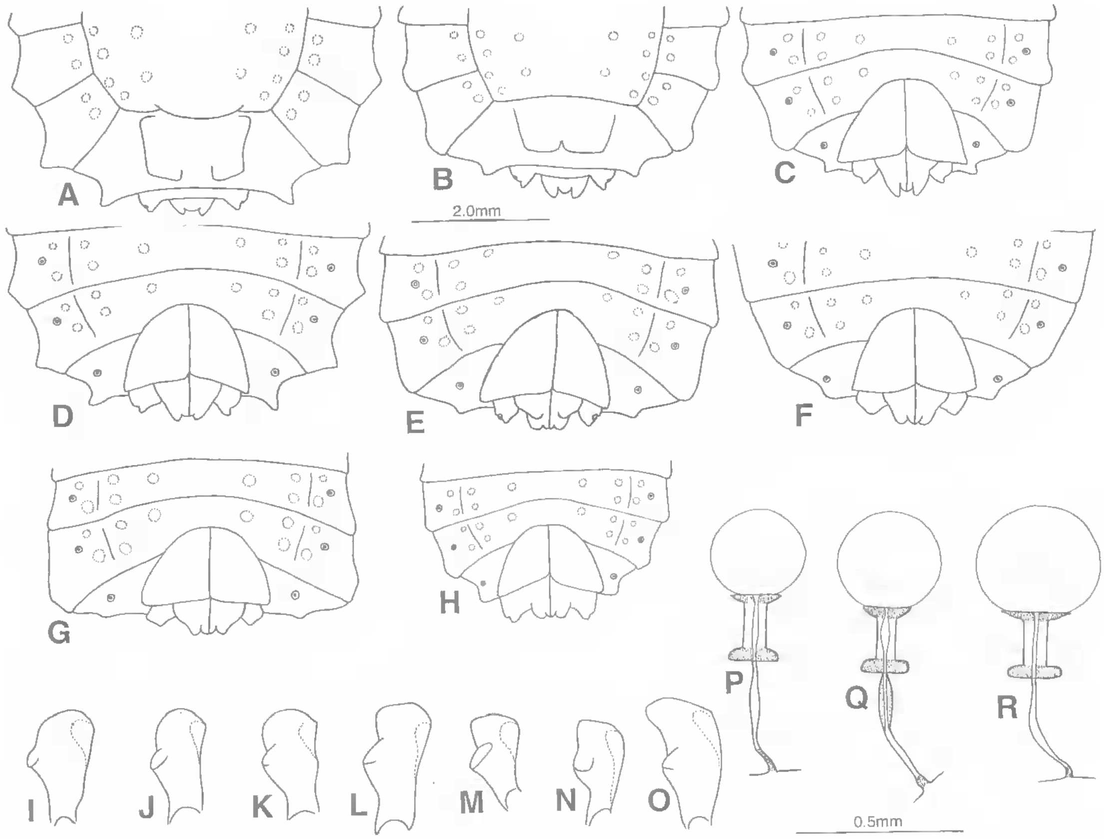

FIG. 54. *Neophloeobia* spp.; A-H, ♀ abdominal apices, dorsal (d) and ventral (v); A, *N. paluma* d; B, *N. mirabilis* d; C, *N. mirabilis* v; D, *N. paluma* v; E, *N. montrouzieri* v; F, *N. cataracta* v; G, *N. australiensis* v; H, *N. bulburina* v; I-O, left parameres, outer view; I, *N. australiensis*; J, *N. paluma*; K, *N. cataracta*; L, *N. montrouzieri*; M, *N. elongata*; N, *N. mirabilis*; O, *N. incisa*; P-R, spermathecae; P, *N. mirabilis*; Q, *N. australiensis*; R, *N. montrouzieri*.

apices; legs indistinctly bicoloured with a median pale ring on femora and subbasal and apical rings on tibiae.

Abdominal tergal disc broadly raised with inner glabrous areas of Tg III large and undivided; incipient opposable tubercles along lateral margins at junctions of Tg III, IV, V and VI; scent gland scar contrastingly pale, with a median tubercle; Cx of segment II narrow, elongate; lateral margins of Cx V and VI weakly lobed posteriorly, that of VII with a prominent, blunt angulation; paratergites of VIII clavate, apices strongly oblique, with spiracles laterally displaced. Abdominal St II-V with shallow median depressions; St VII triangular, with anterior suture strongly angled anteriorly, almost bisecting St VI; St VII with a median, polished callosity at apex of angulation of anterior suture, callosity tapering posteriorly as an unpolished ridge. Parameres as in Fig. 54O.

FEMALE. As for ♂ except: abdominal tergal disc elevated on its midline posteriorly, the elevation overhanging suture between Tg VI and VII; Tg VII with a quadrate elevation which is depressed in the centre and has two elevations on its posterior margin; lateral margin of Tg VII with a small, blunt angulation; paratergites of VIII produced as a small triangular projection mesal of each spiracle. Median length of St VII subequal to length of V and VI combined.

MEASUREMENTS. Holotype ♂ first, then ranges of 2 paratype ♂, then a single available ♀ L: 6.67, 6.17-6.33, 8.08; W: 3.25, 2.83-3.08, 4.00; HL: 1.88, 1.64-1.76, 1.95; HW: 1.36, 1.32-1.36, 1.44; PL: 0.8, 0.72-0.76, 0.78; PW: 1.96, 1.80-2.00, 2.19; AS: I, 0.66, 0.64-0.66, 0.75; II, 0.46, 0.46-0.48, 0.34; III, 0.92, 0.78-0.88, 1.00; IV, 0.54, 0.48-0.50, 0.47.

DISTRIBUTION (Fig. 56). Rainforests of high and low altitude in the high rainfall region around Mackay-Proserpine, central coastal Queensland.

REMARKS. This is the southernmost member of the group of species in which ♂ have a median callosity of St VII and which are found as allopatric forms in coastal N central Queensland. The distinctive, deeply incised St VI in the ♂ sets this species apart and is the origin of its specific name. Of the 32 specimens available only one is a ♀.

Neophloeobia paluma sp. nov.
(Figs 53D,K,Q, 54A,D,J)

TYPE. Holotype ♂, Mt Spec, via Paluma, N Qld., 8.xii.1965, G.B. Monteith, QMT11678.

MATERIAL EXAMINED. Holotype and 8 paratypes: NORTH QUEENSLAND: Mt. Spec, via Paluma, 1♂ holotype, 8.xii.1965, GBM, 1♂ 1♀ paratypes, 21.iv.1968, GBM; 2.7 ml. W of Paluma, ex leaf litter, 1♂ paratype, J.G. Brooks; Bluewater Range, 45km WNW Townsville, 600-700m, 4♂ 1♀, 6-8.xii.1986, GBM, GIT & SH, in QM. (QM duplicates lodged in BMNH, EH) (paratypes: QMT14878-14884).

DESCRIPTION. Medium-sized, 6.5-8.3mm long, elongate, with acute head processes and angled connexival margins at rear.

MALE. Head long, length 1.25-1.36 times width; dorsum with sparse curled vestiture and with 2 rows of granules on vertex; postocular tubercles short, straight, usually not attaining outer profile of eyes; eyes sessile, with cleft between them and antenniferous tubercles virtually absent; antenniferous tubercles long, extending beyond eyes by distance equal to 2.5 times eye diameter, apices acute, slightly curving laterally; genal processes long, parallel-sided with apices acute. Antennae long, 1.25-1.35 times head length, segment III longest; antennal setae, short, sparse, adpressed.

Pronotum 2.5 times as wide as long, its lateral margins explanate, reflexed and narrowing anteriorly; submedian areas with large glabrous discs, weakly elevated, sublateral areas each with a granular ridge lower than lateral, pronotal margins; hind border of pronotum slightly convex posteriorly in middle, margined. Mesonotum with scutellar area distinctly raised, densely granular, with median longitudinal groove. Metanotum with sublateral areas granular, with central shallow foveae which open posteriorly to vicinity of opposable tubercles on Tg I. Legs with inconspicuous, adpressed setae; legs bicoloured, femora each with a median pale ring, tibiae each with sub-basal and apical rings.

Abdominal tergal disc broadly raised on anterior half; inner glabrous areas of Tg III large, undivided; opposable tubercles present along sides of tergal disc at junctions between Tg III, IV, V and VI; scent gland scar contrastingly pale; Cx II long and narrow; lateral margins of Cx V weakly angulate, those of VI and VII strongly so; paratergites of VIII clavate, mesal side of apices pointed spiracles lateral. Pattern of glabrous areas strongly impressed on abdominal sterna; St II-VI with median depressions; St VI slightly narrowed by anterior introgression of VII on its midline; St VII with a small, polished, median callosity near anterior margin, callosity extending posteriorly as an unpolished ridge. Parameres as in Fig. 54J.

FEMALE. As for ♂ except: abdominal tergal disc elevated on its midline posteriorly, the elevation overhanging suture between Tg VI and VII; Tg VII with high quadrate elevation and a pair of posterior, transverse tubercles; paratergites of VIII pointed; median length of St VII shorter than that of V and VI combined.

MEASUREMENTS. Holotype ♂ first, then ranges of additional 2♂ and 1♀. L: 7.00, 6.5-7.5, 8.33; W: 3.33, 3.08-3.75, 4.5; HL: 1.84, 1.76-2.08, 2.08; HW: 1.48, 1.40-1.52, 1.6; PL: 0.84, 0.8-0.88, 0.92; PW: 2.00, 2.0-2.2, 2.36; AS: I, 0.72, 0.66-0.76, 0.80; II, 0.46, 0.40-0.48, 0.50; III, 0.82, 0.72-0.84, 0.92; IV, 0.50, 0.46-0.50, 0.50.

DISTRIBUTION (Fig. 56). Mt Spec plateau and the Bluewater Range a little N of Townsville, N Queensland.

REMARKS. *N. paluma* is a rare rainforest species of which few specimens have been taken despite intensive search within its range. The rainforest tract it inhabits is depauperate in many other groups of insects.

Neophloeobia cataracta sp. nov.
(Figs 53C,H,P,T, 54F,K)

TYPE. Holotype ♂, Wallaman Falls, via Ingham, N Qld., 7 Aug., 1968, B. Cantrell, QMT11679.

MATERIAL EXAMINED. Holotype and 5 paratypes: NORTH QUEENSLAND: Wallaman Falls, via Ingham, 2♂, 3♀, 7.viii.1968, BKC, in QM. (paratypes: QMT14855-14859).

DESCRIPTION. Medium-sized, 6.5-7.83mm long, elongate, virtually glabrous, without explanate pronotal margins.

MALE. Head long, length 1.25-1.3 times width; dorsum almost glabrous, with 2 indistinct rows of granules on vertex; postocular tubercles very short, straight, not reaching outer profile of eyes; eyes sessile, with cleft between eyes and antenniferous tubercles almost occluded; antenniferous tubercles short, straight, divergent, extending beyond eyes by distance equal to 1½ times eye diameter; equal processes long, straight, parallel-sided, with apices subacute. Antennae long, without erect setae, length 1.35-1.4 times head length; segment III longest, almost twice as long as II.

Pronotum wide, 2.8 times as wide as long; lateral margins without explanate extensions, subparallel; submedian areas with large glabrous discs; sublateral areas granular, slightly raised, but lower than pronotal margins; hind pronotal margins convex posteriorly, bordered. Mesonotum with scutellar region elevated, granular, with indistinct median groove; sublateral areas of metanotum rugose, each with a small central fovea which leads posteriorly to vicinity of opposable tubercles on suture between Tg I and II. Legs almost glabrous, bicoloured, with a single median pale ring on each femur and with tibiae pale with a median dark ring.

Abdominal tergal disc raised along anterior edge; inner glabrous areas of Tg III large, undivided; scent scar elevated and contrastingly pale; 3 pairs of small opposable tubercles along lateral edges of tergal disc at junctions of Tg III, IV, V and VI; Cx II long, narrow; lateral margins of Cx V and VI weakly lobed, those of VII angulately so; paratergites of VIII clavate with mesal side of apices slightly produced. Glabrous area pattern of abdominal sterna distinct; St II-VI with median depressions; St VI slightly narrowed by forward extension of midline of VII; St VII with a small, median, polished callosity extending posteriorly as a tapering ridge. Parameres as in Fig. 54K.

FEMALE. As for ♂ except: Abdominal tergal disc elevated medially at rear, elevation overhanging suture between Tg VI and VII; Tg VII with quadrate elevation depressed in centre and with a pair of posterior tubercles; margins of Cx V and VI not lobed, that of VII with a small angulation; paratergites of VIII subacute; median length of St VII shorter than length of V and VI combined. Spermatheca and its duct simple.

MEASUREMENTS. Holotype ♂ first, then ranges of additional 1♂ and 2♀. L: 7.50, 6.50, 7.67-7.83; W: 3.58, 2.92, 3.83-4.08; HL: 1.88, 1.72, 1.80-1.88; HW: 1.48, 1.36, 1.44-1.52; PL: 0.80, 0.72, 0.80; PW: 2.24, 1.96, 2.32-2.36; AS: I, 0.72, 0.70, 0.70-0.72; II, 0.52, 0.48, 0.48; III 0.92, 0.86, 0.90; VI, 0.50, 0.46, 0.48.

DISTRIBUTION (Fig. 56). Single series from a rainforest plateau at the head of Wallaman Falls, near Ingham, N Queensland.

REMARKS. *N. cataracta* is the northernmost of 3 closely related, allopatric species (including *N. incisa* and *N. paluma*) occurring in coastal N Queensland. It is named in reference to the spectacular Wallaman Falls, the tallest uninterrupted falls in Australia, at the type locality.

Neophloeobia elongata sp. nov.
(Figs 4K, 53J,N, 54M, 55)

TYPE. Holotype ♂, Crystal Cascades, via Cairns, N Qld., 9.xii.1964, G. Monteith, QMT11680.

MATERIAL EXAMINED. Holotype and 27 paratypes: NORTH QUEENSLAND: Bloomfield Rd, 9 ml S Helenvale, 1♀, 21.v.1972, J.G. Brooks, in ANIC; Cape Tribulation, 50m, Qm Berl 479, 1♂, 22.ix-7.x.1982, GBM, DKY & GIT, 10m, QM Berl 254, 1♂, 13.x.1980, GBM, in QM, ANIC Berl 939, 940, 2♂ 1♀, 21-28.iii.1984, AC & TAW, in ANIC; Mt Sorrow, via C.Tribulation, 300-800m, 1♂ 1♀, 15.x.1980, GBM, in QM; Cooper Creek, 18ml. N of Daintree River, 1♀, 21-22.vi.1969, GBM; Noah Ck, ANIC Berl 946, 4♂, 27.iii.1984, AC & TAW, in ANIC; Mossman Gorge, via Mossman, 2♂ 1♀, 25-26.xii.1964, GBM; Crystal Cascades, via Cairns, 5♂, 8.xii.1964, GBM, 1♂ 1♀, 8.vii.1966, GBM; Davies Creek Rd, 750m, 1♂, 17.xii.1989, GBM & GIT; Non-paratypes: Upper Mulgrave River, 1♀, 30.iv.1970, GBM, in QM, 3♂, ANIC Berl 951, 2.iv.1984, in ANIC; Lacey's Creek, Mission Beach, 1♂ 1♀, 21.iv.1970, GBM, in QM. (QM duplicates lodged in BMNH, SAM, UQIC) (paratypes: QMT14860-14868, QMT14872-14875).

DESCRIPTION. Small, 5.83-7.67mm long, elongate, without callosity on ♂ St VII and with unbanded legs.

MALE. Head relatively broad, 1-1.2 times as long as broad; dorsum with sparse, semi-erect setae; double row of granules on vertex indistinct; postocular tubercles small, subtriangular, directed slightly posteriorly, usually attaining outer profile of eyes; eyes small, exserted, separated

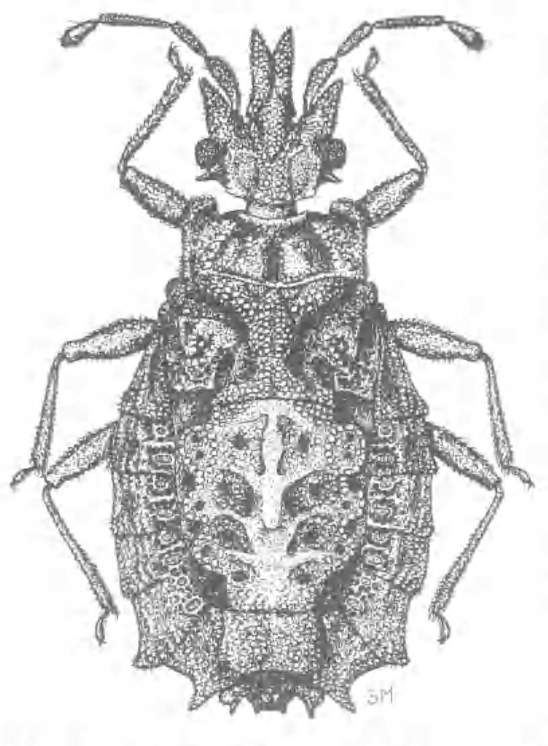

FIG. 55. Dorsal view of ♀ paratype of *Neophloeobia elongata*.

from antenniferous tubercles by a broad deep cleft; antenniferous tubercles long, apices acute, divergent, extending beyond eyes by distance equal to almost 2 eye diameters; genal processes long, parallel-sided, apices attenuate and acute. Antennae long, 1.3-1.45 times head length; segment III longest, about 1.7 times length of II.

Pronotum 2.5-2.7 times as wide as long; lateral margins weakly explanate, narrowing anteriorly; submedian areas forming indistinct tubercles; sublateral area granular, not raised; posterior pronotal margin almost straight, weakly bordered medially. Mesonotum with scutellar region strongly elevated, granular, extending posteriorly to midline of Tg I; sublateral areas granular, setose; metanotum with channels running obliquely from median ridge to vicinity of opposable tubercles at suture between Tg I and II. Legs with adpressed setae and without banding.

Abdominal tergal disc with a defined, trapezoidal area on anterior half enclosing inner glabrous areas of Tg III which are undivided; scent gland scar with a weak tubercle centrally; 3 pairs of weak opposable tubercles along lateral margins of tergal disc at junctions of Tg III, IV, V and VI; Cx plates of Tg II not broadened; margins of Cx II-V not lobed, those of VI and VII prominently angulate; paratergites of VIII clavate with mesal side of apices produced. Glabrous area pattern of abdominal St weakly impressed; St II-VI with median depressions; St VII with anterior suture not bent forward anteriorly and without a median, polished callosity. Parameres as in Fig. 54M.

FEMALE. As for ♂ except: Abdominal tergal disc slightly raised in midline posteriorly; Tg VII with quadrate elevation, depressed in centre; margins of Cx VI and VII angulately produced, those of VII strongly so; median length of St VII longer than length of V and VI combined. Spermatheca and its duct simple.

MEASUREMENTS. Holotype ♂ first, then ranges of additional 2♂ and 2♀. L: 6.33, 5.83-6.33, 6.67-7.67; W: 2.92, 2.75-2.88, 3.33-3.83; HL: 1.76, 1.56, 1.68-2.20; HW: 1.48, 1.40-1.52, 1.60-1.72; PL: 0.64, 0.68, 0.80-0.84; PW: 1.76, 1.64-1.88, 1.96-2.12; AS: I, 0.70, 0.68-0.70, 0.72-0.82; II, 0.44, 0.40, 0.42-0.46; III, 0.72, 0.66-0.72, 0.72-0.8; IV, 0.48, 0.42-0.44, 0.42-0.44.

DISTRIBUTION (Fig. 56). Lowland rainforests of the main wet tropical belt of north Queensland from Cape Tribulation to Mission Beach.

REMARKS. This is the only species of *Neophloeobia* which is restricted to low altitudes, all specimens having been taken virtually at sea level. There is no complementary species known from the adjacent highlands of the Atherton Tableland and there the ecological role of the genus seems to be taken by *Granulaptera*.

N. elongata is not related to the 3 other species known from the northern half of Queensland but shows several features in common with the three species in southern Queensland and N N.S.W. (see Key). There is some variation within the species, with specimens from the southern part of its known range having much blunter head processes; for this reason the specimens listed above from Upper Mulgrave River and Mission Beach have been excluded from the paratype series.

Mesophloeobia gen. nov.

DESCRIPTION. Small to medium-sized, apterous.

Head about as long as wide; postocular tubercles narrow, pointed, directed at right angles to head; eyes sessile or moderately exserted, sepa-

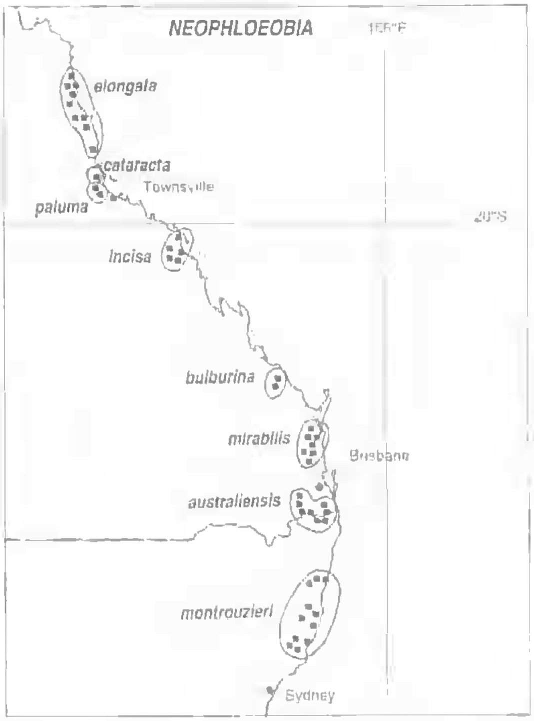

FIG. 56. Records of *Neophloeobia* species in eastern Australia.

rated from antenniferous tubercles by a variable cleft, usually shallow; antenniferous tubercles long, divergent, with straight external margins; genal processes sometimes not fused at base anterior to clypeal apex; rostral groove closed posteriorly; rostral atrium closed. Antennae with segments II and III of lesser diameter than that of I and IV; segments II, III and IV usually subequal in length.

Pronotum with median, longitudinal sulcus and without prominent elevations in either submedian or sublateral positions; antero-lateral angles of prothorax with explanate lobes whose outer margins are continuous posteriorly to postero-lateral angles; pronotal collar distinct, delimited dorsally by a furrow, but lacking dorsal and ventral opposable tubercles. Meso- and metanota without elevations laterad of midline; suture often present medially between meso- and metanota; thoracic and abdominal terga without any opposable tubercles developed. Legs rarely bicoloured. Tarsal pulvilli present, spatulate.

Fused abdominal tergal disc not inflated; pattern of glabrous areas usually indistinct; suture between Tg I and II complete for full width; lateral margin of Cx VII angled in ♂.

Median impressions indistinct on meso- and metasterna; pattern of glabrous areas weakly impressed on abdominal sterna; ♀ with median length of St VII longer than combined length of V and VI.

Spermatheca and its duct without modifications. Parameres with a row of fine teeth on inner face.

TYPE SPECIES. *Mesophloeobia vetusta*, sp. nov.

DISTRIBUTION (Fig. 10F). Australian endemic from N N.S.W. to N Queensland.

REMARKS. The 4 species here included in *Mesophloeobia* comprise a closely related pair (*M. vetusta* and *M. australica*) which are rather remotely related to *M. kirrama*. The relationships of *M. yeatesi*, remain unclear because it is known from a single ♀. All species show relictual and/or disjunct distributions in E Australia and this, together with their primitive retention of a complete suture between abdominal terga I and II, indicates that *Mesophloeobia* contains some of the earliest stocks of Australian apterous Aradidae. *M. kirrama* has discrete wing vestiges and significant retention of the pronotal hind lobe, characters by which it could conceivably have been separated generically.

KEY TO THE SPECIES OF *MESOPHLOEOBIA*

1. Spiracles of abdominal segment VII placed at lateral edge and visible from above; genal processes pointed; ♀ with margin of Cx VII angled . . . . *kirrama*, sp.nov.
   Spiracles of VII ventral, not visible from above; genal processes blunt; ♀ with margin of Cx VII straight 2

2(1). Lateral margins of pronotum straight, converging posteriorly; metapleural scent gland widely open . . . . *yeatesi*, sp. nov.
   Lateral margins of pronotum convex for whole length, not converging posteriorly; metapleural scent gland opening a narrow slit 3

3(2). Legs and antennae clothed with long erect setae; a deep cleft present between eye and antenniferous tubercle; male usually with subapical ventral spinules on femora . . . . *vetusta*, sp. nov.
   Legs and antennae clothed with short, adpressed setae; notch between eye and antenniferous tubercle inconspicuous; male never with subapical ventral spinules on femora . . *australica* (Usinger & Matsuda) *comb. nov.*

Mesophloeobia vetusta sp. nov.
(Fig. 58B,G,I,L,O,Q)

Neophloeobia montrouzieri Usinger & Matsuda, 1959; Kormilev, 1965a (misident. of *Mesophloeobia vetusta*, sp. nov.); Kormilev, 1967a: 524 (misident. of *M. vetusta*, sp. nov.).

TYPE. Holotype ♂, Lamington Nat. Pk, SE Qld., 19.iii.1966, G. Monteith, QMT11681.

MATERIAL EXAMINED. Holotype and 180 paratypes: SOUTH QUEENSLAND: Mt Tamborine, 1♀, A.M. Lea, in SAM; 4 ml. S of Canungra, 1,000', 8♂ 4♀, 10.xii.1972, GBM; Upper Canungra Creek, 2♂, 25.xii.1971, GBM; Springbrook, 5♂ 1♀, 22.v.1965, BKC, 2♂ 1♀, 12.ix.1965, GBM, in QM; Lamington NP, 33♂ 19♀, 5.xi.1989, E.Heiss, in EH, 2♂, ANIC Berl. 460, 21.iii.1973, R. Kohout, in ANIC, 1♂ 1♀, 4.i.1968, BKC, 6♂ 4♀, 19.iii.1966, GBM, 5♂, 23.ii.1965, GBM, 1♀, 21.xi.1965, BKC, 1♀, 25.v.1966, GBM, 4♂ 2♀, 8.v.1965, GBM, 3♂ 3♀, *Nothofagus*, 3,800', 30.i.1965, GBM, 1♂, 17-24.v.1965, GBM, 1♀, 15.vi.1963, GBM, 1♂, 26.vii.1970, GBM, 3♂ 1♀, 28.ix.1975, GBM, 1♂ 1♀, 4.ix.1966, GBM, 5♂ 3♀, 8.x.1979, GBM, 5♂, 28.xii.1971, GBM, 1♂, 17.viii.1965, GBM, 5♂, 3♀, 3.xi.1979, GBM, 6♂ 1♀, 23.iii.1992, GBM; Mt Chinghee, 720m, 12km SE Rathdowney, 11♂ 7♀, 17.xii.1982, GBM, DKY & GIT; Upper Tallebudgera Ck, 500m, 6♂ 1♀, 11.ii.1989, GBM, 5♂ 1♀, 600m, 9.xii.1984, GBM & DJC, 5♂ 3♀, 20.vii.1984, in QM. NEW SOUTH WALES: Wiangaree SF, via Kyogle, 1♂, 2.xi.1970, GBM, 1♂ 2♀, 10.xi.1974; Bar Mountain, via Kyogle, 3,500', 8♂ 2♀, 7.ii.1978, GBM; Nightcap Track, Via Dunoon, 2,700', 2♂ 4♀, 25.xi.1972, GBM; Broken Head, ex pitfall trap, 1♂, GBM; Boatharbour, via Lismore, 1♂, 23.vii.1982, S&JP; Bruxner Park, via Coffs Harbour, 7♂ 2♀, 16.iv.1968, GBM, 2♂ 1♀, 25.ii.1967, GBM in QM; Dorrigo NP, 3♂ 1♀, 19.ix.1979, D. Doolan, 1♀, 10.x.1977, D.Doolan, 1♀, 18.iv.1975, D. Doolan, in AM, 2♂ 2♀, 10.iv.1966, S.R. Curtis, 3♂ 1♀, 10.iv.1966, GBM, 1♂, 10.iv.1966, BKC, 3♂, 21.I.1966, BKC, 1♂, 10.iv.1966, TAW, 1♂, 16.ii.1957, E.N. Marks; Moonpah SF, via Dorrigo, 4♂ 3♀, 11.xii.1971, GBM; Buladelah SF, via Buladelah, 1♂ 2♀ 1 N, 7.i.1967, GBM, in QM; Styx R., 15km SSW Ebor, 1♂, 14.xii.1984, DKY, in UQIC; Bruxner Park, via Coffs Harbour, rainforest log litter, 1♂, 9.vii.1978, S&JP; Gloucester R, Barrington Tops, 1♂, 12-14.xi.1981, TAW & AC, in ANIC. (QM duplicates lodged in BMNH, DJ, SAM, EH, NMNH, NRS, HUB, HNHM, MNHG, UZMH) (paratypes: QMT29905-30079).

DESCRIPTION. Medium-sized, 6.3-7.8mm long, broad, with erect setae on legs and antennae. MALE. Head longer than wide, length 1.11-1.17 times width; dorsum with sparse, erect setae and 2 irregular, widely spaced rows of granules on vertex; postocular tubercles narrow, apically acute, directed laterally and reaching beyond outer profile of eyes; eyes exserted, separated from antenniferous tubercles by a deep cleft; antenniferous tubercles long, divergent, apically subacute, extending beyond eyes by 2½ eye diameters; genal processes broad, flattened, with apices rounded. Antennae 1.15-1.21 times head length; segment I and III longest, subequal; segment IV longer than II; all segments with long, erect setae.

Pronotum transverse, width 2.8-3.1 times median length; antero-lateral angles with semicircular, explanate lobes about 4 times the size of an eye; pronotal surface with scattered shining granules; submedian areas with glabrous discs sloping upwards laterally; sublateral areas with row of granules forming a weak, longitudinal ridge; posterior pronotal margin weakly convex. Mesonotum separated from metanotum by a complete posterior suture; scutellar area not elevated; sublateral areas each with a crescentic, longitudinal ridge. Metanotum and abdominal Tg I fused, the latter with a ridge forming an inverted V on midline. Legs setose, not bicoloured; femora usually with a patch of subapical, ventral spinules, sometimes specialized into a single prominent spine.

Abdominal tergal disc flat, with pattern of glabrous areas strongly defined by ridges in middle and by rows of close-packed granules laterally; anteriorly with a median ridge leading along midline to a raised, setose tubercle of the scent gland scar; posterior to latter tubercle is a contrastingly pale, triangular scar. Side of Cx II, III and IV straight, side of Cx VII with angled margin; paratergites of VIII clavate, with mesal side of apices bluntly produced. Meso, meta- and abdominal sterna with median impressions almost obsolescent; sternal pattern of glabrous area barely discernible; St VI not narrowed by St VII, the latter smooth and polished medially. Paramere as in Fig. 58Q.

FEMALE. As for ♂ except: Tergal disc with a granular tubercle on midline behind anterior margin; Tg VII weakly elevated and bearing 2 prominent, circular tubercles near posterior margin; sterna with median impressions and glabrous area pattern more distinct; femora without subapical, ventral spinules; spermatheca as in Fig. 58O.

MEASUREMENTS. Holotype ♂ first, then ranges of additional 2♂ and 2♀. L: 7.17, 6.33-6.67, 7.67-7.83; W: 3.58, 3.3-3.42, 4.17-4.67; HL: 1.96, 1.76-1.88, 2.00; HW: 1.68, 1.56-1.68, 1.76-1.80; PL: 0.76, 0.72-0.80, 0.80-0.84; PW:

2.40, 2.20, 2.44-2.48; AS: I, 0.60, 0.60-0.66, 0.70-0.74; II, 0.46, 0.44-0.46, 0.44-0.50; III, 0.68, 0.60-0.64, 0.64; IV, 0.56, 0.50-0.54, 0.52-0.54.

DISTRIBUTION (Fig. 59). Common in wet rainforests from the Lamington, Tamborine and Springbrook Plateaus, SE Queensland to Barrington Tops in N N.S.W. It usually occurs at higher elevations but there are several records from lowlands close to the coast (Bruxner Park, Tallebudgera Ck, Boat Harbour, Buladelah, Broken Head).

REMARKS. *M. vetusta* has a close superficial similarity in overall facies to *Neophloeobia montrouzieri* and has been misidentified as that species several times in the literature (Kormilev, 1965a, 1967a). It is closely related to *M. australica* from low elevations adjacent to parts of its range. The ranges of the 2 species overlap slightly near the coast in N N.S.W. The principal difference between the two species is in the surface setae of the antennae and legs which are long and erect in *M. vetusta*. This character often correlates with high altitude habitat in apterous mezirines. For example, in 2 closely related species of *Granulaptera* from N Queensland, the high altitude species, *G. alticola*, has similar erect setae while its lower altitude relative, *G. spiniceps*, has short adpressed setae comparable with those of *M. australica*.

Mesophloeobia australica
(Usinger & Matsuda, 1959) *comb. nov.*
(Figs 5U-V, 58C-E,H,N,P)

Neophloeobia australica Usinger & Matsuda, 1959: 322 (descr., fig.); Kormilev & Froeschner, 1987: 163 (listed).

TYPE. Holotype ♀, Byron Bay, Australia, xii.1904, Helms Coll. Originally lodged in Bishop Museum, Honolulu, but transferred by exchange to the Queensland Museum, Brisbane (QMT6689). Examined.

MATERIAL EXAMINED. Holotype and 96 specimens. NORTH QUEENSLAND: Broadwater SF Park, 35km NW Ingham, 1♂ 1♀ 16.xii.1986, GBM, GIT & SH; Wallaman Falls, via Ingham, 3♂, 7.viii.1968, BKC, 1♂, 6.viii.1968, TAW, 4♂ 3♀, 12.v.1970, GBM, 20♂ 11♀, 1.x.1980, GBM; Wallaman Falls Rd Junction, 2♀, 5.ii.1996, GBM; Mt Fox Rd, Seaview Range, rf, 600m, 5♂ 2♀, 15.xii.1986, GBM, GIT & SH, 1♂, litter berlesate, 15.xii.1986, GBM & GIT, in QM. CENTRAL QUEENSLAND: Cape Hillsborough NP, Andrews Pt, 2♂, 15.iv.1979, GBM. SOUTH QUEENSLAND: Kroombit Tops, 1000-1100m, 2♂ 2♀, 22-26.ii.1982, GBM,DKY & GIT; Kroombit Tops, Three Moon Ck, 1♂, 9-19.xii.1983, GBM & GIT; Kroombit Tops, Beauty Spot 98, 11♂ 6♀, 9-19.xii.1983, GBM & GIT; Forest Station 2,000', Bulburin SF, via Many Peaks, 4♂ 1♀, 2-5.iv.1972, GBM, 4♂ 2♀, 12-15.iv.1974, GBM, 1♂ 1♀, 17.ix.1989, GBM; Granite Creek, 700', Bulburin SF, 1♂, 1.iv.1972, GBM, in QM. NEW SOUTH WALES: Whian Whian SF, 700', via Dunoon, 3♂ 1♀, 25-26.xi.1972, GBM, in QM. (QM duplicates lodged in BMNH, DJ, EH, NMNH, HNHM).

DESCRIPTION. Small, 5.3-6.5mm long, smooth, with surface setae short and adpressed.

MALE. Head length 1.1-1.13 times width; dorsum granular, with scattered short setae; postocular tubercles straight, apically acute, reaching slightly beyond outer profile of eyes; eyes subsessile, separated from antenniferous tubercles by a narrow cleft; antenniferous tubercles slightly curved laterally, apices subacute, extending beyond eyes by 2 eye diameters; genal processes flattened with sides convergent and apices rounded. Antennae with length 1.25-1.5 times head length, with vestiture of sparse, adpressed setae; segment III longest.

Pronotum transverse, with width 3 times median length; median sulcus bordered by 2 short curved carinae; submedian areas with flat glabrous areas; sublateral areas virtually flat; anterolateral angles with narrow explanate margins which extend round to anterior margin where they are truncate; hind pronotal margin convex in middle, bordered. Mesonotum with scutellar region slightly elevated and with a median groove; sublateral areas somewhat inflated and granular; metanotum depressed medially and slightly inflated laterally; suture between meso- and metanotum complete. Legs usually obscurely bicoloured, with short adpressed vestiture, lacking spinules on subapical region of femora. Abdominal tergal disc flat, its glabrous areas poorly defined in middle and indicated by rows of granules laterally; scent gland scar consisting of a short, dark ridge superimposed on a pale scar; lateral margins of Cx II, III and VI straight, that of V flared posteriorly so that maximum body width is across segment V; margin of Cx angled. Paratergites of VIII clavate with mesal side of apices slightly produced. Meso- and metasterna and trochanters pale; thoracic sterna without median impressions; pattern of glabrous areas moderately impressed on abdominal sterna; St VI narrowed slightly by forward extension of VII, the latter with a small, polished, median callosity near anterior margin; this callosity absent in some populations. Parameres as in Fig. 58P.

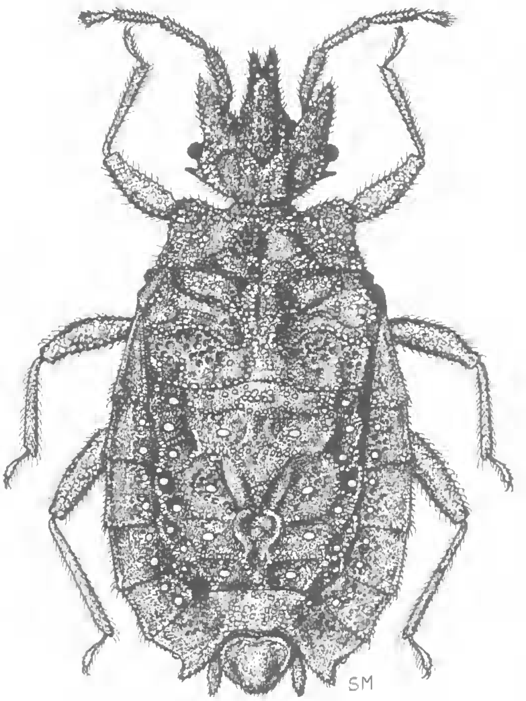

FIG. 57. Dorsal view of ♂ holotype of *Mesophloeobia kirrama.*

FEMALE. As for ♂ except: Margin of Cx VII straight; Tg VII with quadrate elevation and a pair of indistinct posterior elevations; paratergites of VIII blunt; St VII with median length 1.5 times that of V and VI combined. Spermatheca as in Fig. 58N.

MEASUREMENTS. Holotype ♀ first, then ranges of additional 2♂ and 2♀. L: 6.50, 5.35-6.17, 5.33-.6.33; W: 3.67, 2.72-3.25, 3.00-3.58; HL: 1.72, 1.28-1.67, 1.36-1.68; HW: 1.52, 1.16-1.48, 1.20-1.48; PL: 0.68, 0.60-0.72, 0.64-0.72; PW: 2.32, 1.84-2.16, 1.92-2.24; AS: I, 0.56, 0.50-0.56, 0.50-0.58; II, 0.44, 0.38-0.40, 0.36-0.44; III, 0.64, 0.60-0.64, 0.60-0.66; IV, 0.54, 0.44-0.50, 0.40-0.50.

DISTRIBUTION (Fig. 59). A diverse assemblage of disjunct populations from near Ingham in N Queensland to Byron Bay and Lismore on the northern N N.S.W. coast.

REMARKS. Most collections of *M. australica* are from rainforest of poor quality. In the northern part of its range (Wallaman Falls, Bulburin) it occurs on plateaus but is solely a lowland species in N.S.W. Were it not for these indications of broad habitat tolerance allowing wide dispersal I would have separated off the northern populations as a separate species. They are smaller, smoother and with less surface vestiture than topotypic material. Future collecting will assuredly reveal intermediate populations of this widespread species and formal subdivision of the taxon seems undesirable in the meantime.

Mesophloeobia kirrama sp. nov.
(Figs 57, 58F,J,K,M,R)

TYPE. Holotype ♂, Kirrama State Forest, via Cardwell, N Qld., 17-18.viii.1966, G.B. Monteith, QMT11682.

MATERIAL EXAMINED. Holotype and 23 paratypes: NORTH QUEENSLAND: Kirrama SF, via Cardwell, 2♂ 2♀, 17-18.viii.1966, GBM, 2♂ 2♀, 5.v.1983, DKY; Douglas Ck Rd, Kirrama SF, 800m, 2♂ 2♀, 9-12.xii.1986, GBM, GIT & SH; Mt Pershouse, Kirrama SF, 900m, 2♂ 1♀, 12.xii.1986, GBM, GIT & SH; Cardwell Ra., Upper Broadwater Ck valley, 700-800m, 3♂ 2♀, 17-21.xii.1986, GBM, GIT & SH; Cardwell Ra., Mt Macalister Area, 900m, 1♂ 2♀, 18-19.xii.1986, GBM, GIT & SH, in QM. (QM duplicate specimens lodged in BMNH, EH, UQIC) (paratypes: QMT14832-14849, QMT14851-14852).

DESCRIPTION. Medium-sized, 6.5-7.7mm long, dark, with lateral spiracles on segment VII.

MALE. Head slightly longer than wide, its dorsum with scattered erect setae; postocular tubercles narrow, directed laterally, apically acute, reaching outer profile of eyes; eyes small, exserted, separated from antenniferous tubercles by a shallow cleft; antenniferous tubercles almost parallel-sided, apically acute, extending beyond eyes by 3 eye diameters; genal processes long, apically acute, parallel-sided. Antennae 1.2-1.5 times head length, bearing long erect setae; segment I longest, segments II and III subequal, segment IV shortest.

Pronotum rather short and broad, with width 2.5-2.7 times median length, apparently with some trace of posterior lobe retained; anterolateral angles with narrow, forwardly projecting explanate lobes; submedian areas with large glabrous discs; sublateral areas with vestigial row of granules forming a weak longitudinal ridge; posterior pronotal margin almost straight, unbordered. Mesonotum with scutellar area moderately raised, granular, with a median line devoid of granules; small hemelytral vestiges defined by sutures; metanotum and Tg I raised medially and subcontinuous with scutellum. Legs setose, not bicoloured.

Abdominal tergal disc flat, with glabrous areas defined by rows of setigerous granules; anterior half of disc with a low, transverse, raised zone enclosing median areas of Tg III; scent gland scar with a low, setose tubercle posteriorly by a constrastingly pale, triangular scar; lateral margins of Cx II, III and IV straight, those of V with slightly produced posterior angles, those of VII with prominent, acute angulations; paratergites of VIII clavate, with mesal side of apices strongly produced, acute. Meso-, meta- and abdominal sterna with indistinct median impressions; pattern of glabrous areas weakly developed; spiracles of segments II-VI ventral, those of VII lateral, visible from above. Parameres as in Fig. 58R.

FEMALE. As for ♂ except: Tg VII with a low, quadrate elevation; lateral margin of VII acutely angulate; paratergites of VIII pointed. Spermatheca (Fig. 58M) with duct widened for most of its length.

MEASUREMENTS. Holotype ♂ first, then ranges of additional 2♂ and 2♀. L: 6.83, 6.50, 7.33-7.67; W: 3.50, 3.16-3.25, 3.83-3.92; HL: 1.60, 1.60-1.80, 1.88-1.96; HW: 1.60, 1.56-1.60, 1.64-1.76; PL: 0.84, 0.84, 0.88; PW: 2.32, 2.04-2.08, 2.12-2.44; AS: I, 0.72, 0.64-0.70, 0.70-0.74; II, 0.60, 0.50-0.56, 0.52-0.54; III, 0.58, 0.54-0.56, 0.52-0.54; IV, 0.52, 0.42-0.48, 0.42-0.44.

DISTRIBUTION (Fig. 59). Mountain rainforest on the Kirrama and adjacent Cardwell Ranges in the hinterland of Cardwell, N Queensland.

REMARKS. This problematic species has the facies of *Neophloeobia* and since its distribution lies in a zone unoccupied by a species of *Neophloeobia* it would make some distributional sense if it were regarded as a member of *Neophloeobia*, thus filling the geographic hiatus between *N. elongata* and *N. cataracta* in north Queensland. However it appears more closely allied with *Mesophloeobia* as indicated by the key to genera. Additionally it has other features which set it apart from the other species in *Mesophloeobia*, including the distinct wing vestiges and the lateral spiracle on segment VII. The latter character is seen in the New Zealand *Woodwardiessa* and, in a less pronounced form, in *Granulaptera spiniceps*.

Mesophloeobia yeatesi sp. nov.
(Fig. 58A)

MATERIAL. Holotype ♀, Mt Pieter Botte, 7km W Cape Tribulation, 800m, 22.iv.1983, G.B. Monteith & D.K. Yeates, QMT11831.

DESCRIPTION. Medium-sized, 7.2mm long, brown, with a large, widely-open scent gland orifice and hairy tibiae.

FEMALE. Head length about 1.25 times width across eyes, its dorsum with scattered, curled setae and round, polished granules; postocular tubercles narrow, rod-like, directed laterally, almost reaching outer profile of eyes; eyes small, spherical, exserted, separated from antenniferous tubercles by a shallow cleft; antenniferous tubercles divergent, apically sub-acute, extending beyond eyes by 2 eye diameters; genal processes long, parallel, their apices subacute, reaching apex of first antennal segment. Antennae 1.13 times head length, bearing long curled setae on segment I and short adpressed setae on segments II and III; segments II and IV subequal in length, shorter than segments I and III which are also subequal. Neck region rather long.

Pronotum with width 3 times median length; anterolateral angles prominent, smoothly rounded; lateral margins straight, converging posteriorly; submedian areas with glabrous discs each bounded laterally by a low diagonal swelling beset by polished granules; sublateral regions flat, depressed; hind margin of pronotum straight, unbordered. Pronotal collar narrow. Mesonotum with scutellar area weakly convex and with a few large, polished granules; laterad of midline a short, raised, granular, oblique ridge on each side; hemelytral vestiges evident as a small, angular projection on each lateral margin. Metanotum and Tg I raised medially, subcontiguous with scutellum; lateral regions of metanotum somewhat swollen, bearing large, close-set punctures. Metapleural scent gland orifice large, widely open, running obliquely forward from behind mid coxae to the upper edge of the body, visible in dorsal view. Legs with femora pale, indistinctly bicoloured; tibiae with long setae on apical 2/3.

Abdominal tergal disc with glabrous areas defined by low ridges; Tg III transversely elevated, the elevation with a rugose, sparsely setose tubercle at each lateral extremity. Lateral margins of Cx II-VII all straight and unmodified; abdomen broadest across segment V; Tg VII with a setose tubercle each side of midline; paratergites of VIII triangular, spiracles on external margin at half length. Spiracles of segments II-VI placed well

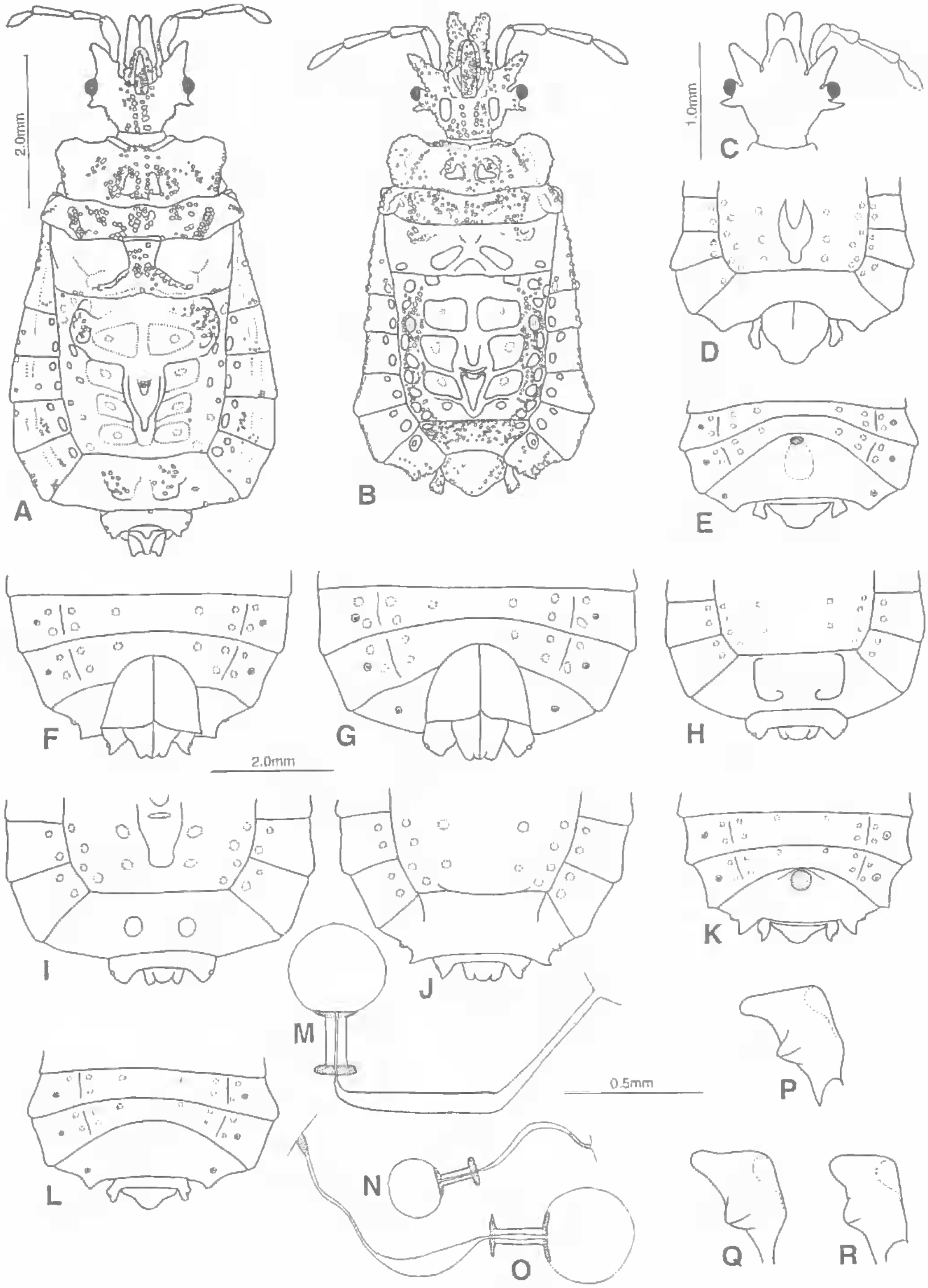

FIG. 58. *Mesophloeobia* spp.; A, *M. yeatesi* ♀; B, *M. vetusta* ♂; C, *M. australica*; D-L, abdominal apices, dorsal (d) and ventral (v); D, *M. australica* ♂ d; E, *M. australica* ♂ v; F, *M. kirrama* ♀ v; G, *M. vetusta* ♀ v; H, *M. australica* ♀ d; I, *M. vetusta* ♀ d; J, *M. kirrama* ♀ d; K, *M. kirrama* ♂ v; L, *M. vetusta* ♂ v; M-O, spermathecae; M, *M. kirrama*; N, *M. australica*; O, *M. vetusta*; P-R, left parameres, outer view; P, *M. australica*; Q, *M. vetusta*; R, *M. kirrama*.

ventral of margin, those of VII close to the posterior margin but not visible from above. Meso- and metasterna smooth medially; abdominal sterna weakly impressed medially.

MEASUREMENTS. Holotype ♀: L: 7.20; W: 3.50; HL: 1.63; HW: 1.31; PL: 0.77; PW: 2.34; AS: I, 0.54; II, 0.38; III, 0.52; IV, 0.40.

DISTRIBUTION (Fig. 59). Wet rainforest on the E slopes of Mt Pieter Botte, a remote granite peak which forms the highest point of the mountain massif behind Cape Tribulation, N Queensland.

REMARKS. This species is named for David Yeates who participated in its collection. In the absence of the ♂ its relationships to the other species are a little hard to estimate. However, it is specifically distinct in the shape of the pronotum and especially in the hypertrophied scent gland orifice. It occurs a considerable distance north of the nearest other member of the genus at Kirrama Range.

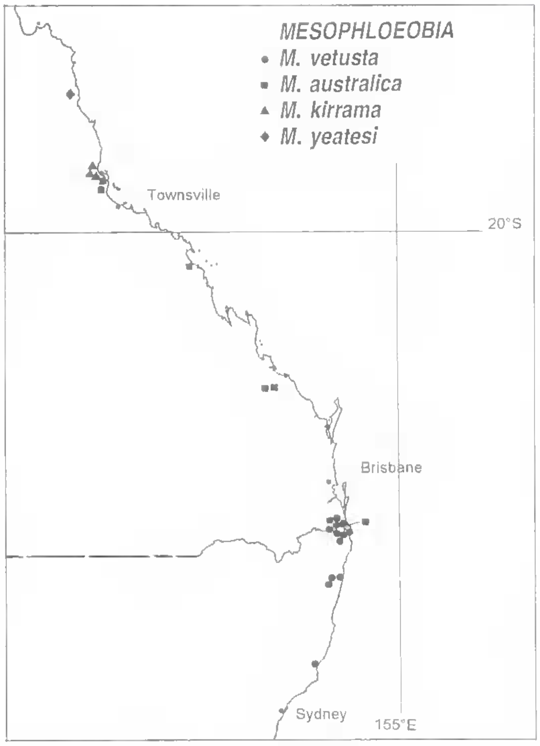

FIG. 59. Records of *Mesophloeobia* species in eastern Australia.

Granulaptera gen. nov.

DESCRIPTION. Small to medium-sized, apterous, with granular body surface.

Head about as wide as long; postocular tubercles present as narrow, pointed, conical or cylindrical processes; eyes not strongly exserted, separated from antenniferous tubercles by a weak cleft; antenniferous tubercles divergent, often long and pointed; genal processes basally fused anterior to clypeus and with divergent apices; rostral groove open or closed posteriorly; rostral atrium closed. Antennae with segments II and III of lesser diameter than segments I and IV; segments II, III and IV usually subequal in length.

Pronotum depressed in middle, with a median, longitudinal sulcus which may be indistinct and defined by a double row of granules; pronotum without prominent elevations at either submedian or sublateral positions; if anterolateral pronotal angles with explanate lobes then their lateral margins terminate anterior to posterolateral angles; pronotal collar not distinct dorsally and without dorsal or ventral opposable tubercles; discrete border to hind pronotal margin absent. Scutellar region of mesonotum elevated and continued posteriorly as a raised ridge to abdominal Tg I; neither mesonotum nor metanotum with discrete elevations laterad of median ridge; thoracic and abdominal terga without any opposable tubercles but with numerous small, round granules on surface. Legs often bicoloured. Tarsal pulvilli present, spatulate.

Fused abdominal tergal disc not inflated; pattern of glabrous areas largely obliterated; suture between Tg I and II fused medially and laterally; lateral margin of Cx VII not angled in ♀.

Median impressions indistinct or absent on meso- and metasterna; pattern of glabrous areas weakly impressed on abdominal sterna; ♀ with median length of St VII longer than combined length of V and VI.

Spermathecal duct entering a large, sclerotised bursa in vaginal wall. Parameres with a row of fine teeth on inner face.

TYPE SPECIES. *Granulaptera verrucosa*, sp. nov.

DISTRIBUTION (Fig. 10A). An Australian endemic with its centre of diversity in the Cooktown-Kirrama region, N Queensland and with one outlying species at Bulburin, southern Queensland.

REMARKS. The 6 species of *Granulaptera* form a close-knit group linked by their granular body surface, their lack of dorsal opposable tubercles and their possession of a remarkable, sclerotised bursa at the point where the spermathecal duct enters the vaginal wall.

The genus is virtually confined to the wet tropical portion of north Queensland but evidence for its origin from a formerly more widespread stock is given by the single species in S Queensland. *Granulaptera* is the commonest apterous aradid in N Queensland and forms large colonies on small sticks and logs of the forest floor. Up to 3 species may be sympatric within their range and sometimes aggregations are found to contain more than one species. The widespread range, geographic variability and plasticity of such species as *G. spiniceps* suggest that *Granulaptera* is undergoing rapid evolution in N Queensland.

KEY TO THE SPECIES OF *GRANULAPTERA*

1. Rostral groove closed behind; genal processes apically acute, sometimes very attenuate; antennal segment III usually more than 1.5 times length of segment IV 2
   Rostral groove open behind; genal processes with blunt apices (except *verrucosa*), not attenuate; antennal segment III less than 1.5 times length of segment IV 4

2(1). Antennal segments II and III with long erect hairs; spiracles of segment VII not close to external margin of body; anterolateral explanate lobes of prothorax large, usually at least two to three times larger than an eye 3
   Hairs on antennal segments II and III short and adpressed; spiracles of segment VII very close to lateral margin of body; anterolateral explanate lobes of prothorax small, barely larger than an eye . . . . *spiniceps*, sp. nov.

3(2). Genal processes very attenuate, almost reaching apex of antennal segment II; paratergites of segment VIII of both sexes drawn out into a tapering process beyond the spiracle (N of Daintree River) . . . . *cooki*, sp. nov.
   Genal processes not so attenuate, rarely reaching beyond half length of antennal segment II; paratergites of segment VIII not conspicuously extended beyond the spiracle (S of Daintree River) . . . . *alticola*, sp. nov.

4(1). Lateral margins of antenniferous tubercles concave; male with external margin of Cx VII angled 5
   Lateral margins of antenniferous tubercles straight; male with external margin of CX VII straight 6

5(4). Apices of antenniferous tubercles and genae pointed; ♀ with median length of St VII shorter than that of IV, V and VI combined . . . . *verrucosa*, sp. nov.
   Apices of antenniferous tubercles and genae blunt; female with median length of St VII longer than that of IV, V and VI combined . . . . *tuberculata* (Kormilev)

6(4). Antennal segments and legs with long erect setae; explanate lateral lobes of pronotum large, extending posteriorly almost to hind angles of pronotum . . . . *remota*, sp. nov.
   Antennal segments and legs with short, adpressed setae; explanate lateral lobes of pronotum small, extending posteriorly only about ½ length of pronotal margins . . . . *ovata*, sp. nov.

Granulaptera tuberculata (Kormilev, 1967) *comb. nov.* (Figs 61E,L,O, 63A,E,J,N)

Neophloeobia tuberculata Kormilev, 1967a: 524 (descr., figs.); Kormilev & Froeschner, 1987: 163 (listed).

TYPE. Holotype ♂, Cairns dist., A.M. Lea, SAM I20,344). Examined.

MATERIAL EXAMINED. Holotype and 80 specimens: NORTH QUEENSLAND: Baldy Mountain Rd, 5 ml SW of Atherton, 4,000', 1♂, 11.v.1970, GBM; Crater NP, 950m, 3♀, 28.xii.1989, GBM; Lake Barrine, 1♂, 18.iv.1984, J.G. Pendergrast; Hughes Road, Topaz, 650m, 2♀, 4-5.xii.1993, GBM, DJC, HJ; Boonjie, 13km ESE Malanda, 700m, 1♀, 8.xii.1988, GBM & GIT; Millaa Millaa Falls, via Millaa Millaa, 2♂, 23.iv.1968, GBM, 5♂ 1♀, 12.viii.1968, BKC; Palmerston NP, via Innisfail, 3♂ 3♀, 7-8.viii.1968, BKC, 2♂ 4♀, 2.i.1990, GBM; Hugh Nelson Ra., 21km S Atherton, 1♀, 1.xii.1983-9.i.1984, RIS & J. Brown; Mt Father Clancy, 9km S Millaa Millaa, 900-1000m, 15♂ 5♀, 6.xii.1988, GBM & GIT, 1♂ 1♀, 850m, 4.v.1983, GBM & DKY; Bellenden Ker Ra., Cable Tower 3, 1000m, 1♀, 25.ix.1981, GBM & DJC; Bellenden Ker Summit TV Stn, 1500m, 1♀, 29.iv-2.v.1983, GBM & DKY, 1♀, 10-12.iv.1979, GBM; Massey Range, 4km W Bellenden Ker Centre Peak, 1250m, 3♂ 2♀, 9-11.x.1991, GBM,DJC,HJ; North Bell Pk, 20km S Cairns, 900-1000m, 1♂ 2♀, 15-16.xi.1981, GBM & DJC, in QM; McNamee Ck, W of Innisfail, 400m, 1♀,8.vii.1971, Taylor & Feehan, in ANIC; Upper Boulder Creek, 1000m, 1♂ 1♀, 5-7.xii.1986, GBM, GIT, HJ; Tully River Xing, 10km S Koombooloomba, 750m, 9♂ 2♀,4-5.i.1990, GBM,SRM; Kirrama SF, via Kennedy, 1♀, 17-18.viii.1966, GBM, 1♂, 2-3.x.1980, GBM; Mt Pershouse, 900m, Kirrama SF, 1♂, 12.xii.1986, GBM, GIT & SH; Mt Hosie, Kirrama SF, 800-930m, 1♀, 10.xii.1986, GBM, GIT & SH, in QM. (QM duplicates lodged in BMNH, ANIC, MDPI, UQIC, DJ, EH, NMNH, HNHM, MNHG).

DESCRIPTION. Small, 6-8mm long, yellowish brown, with blunt head processes and open rostral groove.

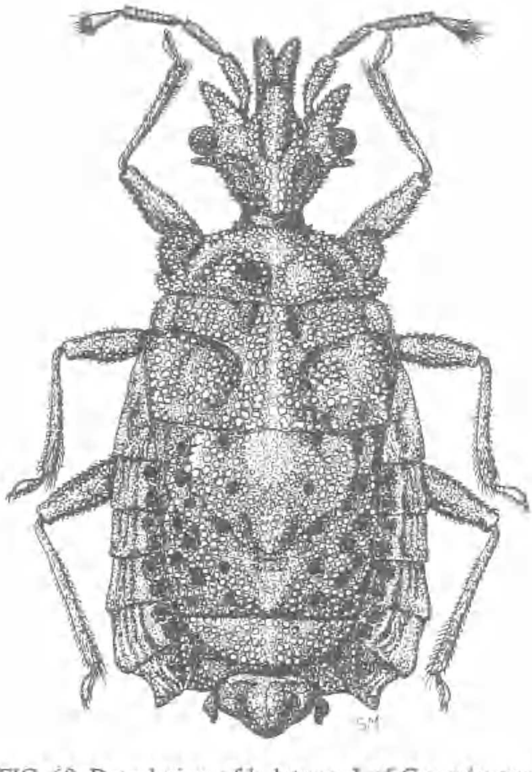

FIG. 60. Dorsal view of holotype ♂ of *Granulaptera verrucosa*.

MALE. Head about as wide as long; dorsum smooth, with several longitudinal rows of small granules on vertex; postocular tubercles straight, apically acute, directed posterolaterally, reaching outer profile of eyes; eyes not stylate, weakly exserted, separated from antenniferous tubercles by a weak, shallow cleft; antenniferous tubercles blunt, curved laterally, extending beyond eye by 1½ eye diameters; genal processes blunt, parallel-sided. Rostral groove not closed posteriorly. Antennae 1.15-1.25 times head length; segment I longest, segments III and IV subequal; setae on II and II short, adpressed.

Pronotum transverse, 3.1-3.5 times as wide as long; median longitudinal sulcus shallow, defined by 2 curved rows of shining granules; submedian areas slightly elevated with large glabrous disc; sublateral areas not raised; anterolateral angles of prothorax with semicircular, explanate lobes, each about 3-4 times size of an eye; posterolateral angles of pronotum each with a small seta-bearing tubercle; hind pronotal margin slightly convex posteriorly, without distinct border. Mesonotum with scutellar region raised into a low ridge extending posteriorly to abdominal Tg I, ridge with a longitudinal groove devoid of shining granules; sublateral areas densely granular. Metanotum with sublateral areas swollen, each with a shining area free of granules which runs along anterior margin and turns posteriorly at right angles. Legs not bicoloured; with short curled setae.

Abdominal tergal disc slightly swollen, with pattern of glabrous areas weakly defined by numerous shining granules; a prominent, oval area with mirror-like surface free of granules present on midline of anterior half; scent gland scar with a central, rugose, setose tubercle; lateral margin of Cx VII strongly angled; paratergites of VIII short, clavate, with mesal side of apices produced, spiracles laterally displaced. Sterna smooth, with glabrous areas faintly defined; midline of St II-VI with median depressions barely distinct; St IV, V and VI narrowed medially; St VII broadly inflated, without callosity. Parameres as in Fig. 63N.

FEMALE. As for ♂ except: Tg VII with a wide quadrate elevation; paratergites of VIII with angular apices and lateral spiracles; St VII as long as median lengths of IV, V and VI combined. Spermatheca of *Granulaptera* type with duct as long as 2½ bulb diameters (Fig. 63J).

MEASUREMENTS. Holotype ♂ first, then ranges of additional 2♂ and 2♀. L: 6.17, 5.92-6.83, 6.00-8.00; W: 3.16, 3.08-3.43, 3.16-4.17; HL: 1.52, 1.52-1.84, 1.52-1.96; HW: 1.64, 1.52-1.72, 1.56-1.84; PL: 0.68, 0.65-0.68, 0.72-0.76; PW: 2.16, 2.00-2.36, 2.08-2.60; AS: I, 0.52, 0.50-0.64, 0.56-0.70; II, 0.38, 0.34-0.44, 0.36-0.42; III, 0.50, 0.44-0.54, 0.50-0.62; IV: 0.42, 0.42-0.48, 0.46-0.50.

DISTRIBUTION (Fig. 65). Rainforests from near Cairns south to the Kirrama Range, N Queensland. The holotype from 'Cairns district' was probably collected on mountains behind Cairns, possibly at Kuranda, where the collector Arthur Lea is known to have worked. If this is so then all known specimens are from mountain rainforests.

REMARKS. This small species is closely related to the type, *G. verrucosa*. The 2 species are geographic segregates of a once more widespread species. They are now divided by the lowland corridor which splits the mountain systems between Cairns and Mossman.

Granulaptera verrucosa sp. nov.
(Figs 60, 61R, 63B,H,P)

TYPE. Holotype ♂, Mossman Gorge, via Mossman, N Qld., 9.viii.1966, G. Monteith, QMT11684.

MATERIAL EXAMINED. Holotype and 87 paratypes: NORTH QUEENSLAND: Mt Halcyon, 870m, 21♂ 10♀, 22-24.xi.1993, GBM, DJC, LR, HJ; 2km W Cape Tribulation, 200m, 1♀, 25.ix.1982, GBM, DKY & GIT; Roaring Meg Valley, 720m, 2♂ 3♀, 22.xi.1993, GBM, DJC, HJ, LR; Noah Ck, via Cape Tribulation, 1♀, 16.x.1980, GBM; Cooper Creek, 13ml N of Daintree River, 9♂ 1♀, 14.xi.1969, BKC, 3♂ 1♀, 21-22.vi.1969, GBM; McDowall Range, 17km N Daintree, 1♂ 1♀, 27.xi.1985, GBM & DJC; Mossman Bluff, 1000m, 2♀, 17-19.xii.1988, GBM & GIT, 2♂ 1♀, 800-1300m, 2.xi.1983, GBM, DKY & GIT; Mt Demi, 7km SW Mossman, 500m, 1♂ 1♀, 26.iv.1983, 1♀, 1100m, 29.x.1983, DKY,GIT, 5♀, 16-17.xii.1995, GBM,GIT; Mossman Gorge, via Mossman, 3♂ 1♀, 9.viii.1966, GBM, 1♂, 28.xii.1967, GBM, 6♂ 4♀, 25-26.xii.1964, GBM; Rex Lookout, nr Mossman, 1♀, 13.x.1980, GBM; Churchill Ck, Mt Lewis Road, 1♂, 27.xi.1965, GBM; Baker's Blue Mtn, 17km w Mt Molloy, 1♂ 1♀, 12.ix.1981, GBM & DJC, in QM. (QM duplicates lodged in BMNH, ANIC, MDPI, DJ, SAM, EH, NMNH, HNHM) (paratypes: QMT14752-14790, QMT148795-14817, QMT14822-14826, QMT25595-25599).

DESCRIPTION. Medium-sized, 7-8.5mm long, with open rostral groove and pointed genal processes.

MALE. Head length 1.0-1.16 times width; dorsum with scattered curled setae, and with several indistinct rows of small granules on vertex; postocular tubercles narrow, apically acute, directed laterally and usually attaining outer profile of eye; eyes exserted with a moderate cleft between them and antenniferous tubercles; antenniferous tubercles long, curved laterally, apically pointed, extending beyond eyes by about 2 eye diameters; genal processes long, sides divergent, apices well separated and acute. Rostral groove not closed behind. Antennal length 1.15-1.20 times head length; segment I longest, segment III longer than II; segments II and III with short, curled vestiture.

Pronotal width a little less than three times median length; median sulcus distinct and bordered by two curved rows of granules; submedian areas elevated into low tubercles each with a glabrous disc on mesal face; sublateral areas granular; anterolateral pronotal angles with semicircular explanate lobes each about twice the size of an eye; posterolateral angles each with a small, dorsal tubercle; posterior margin slightly convex. Mesonotum with scutellar elevation continued posteriorly to abdominal Tg I, its ridge with a smooth median, longitudinal line devoid of granules. Sublateral areas of metanotum swollen, with smooth glabrous region along anterior margin. Legs largely pale with faint dark bands on femoral bases; vestiture short, curled.

Abdominal tergal disc slightly swollen, without ridges defining patterns of glabrous areas; lateral areas of Tg III elevated; tergal disc with an oval, smooth, mirror-like patch on midline of basal half; scent gland scar bluntly raised, setose; lateral margins of Cx VII strongly angulate. Paratergites of VIII clavate with mesal side of apex produced. Sterna smooth, with indistinct glabrous areas; midline of St II-VI with weak depressions; St V and VI narrowed medially; St VII without callosity. Parameres as in Fig. 63P.

FEMALE. As for ♂ except: Tg VII with quadrate elevation bearing 2 posterior tubercles; paratergites of VIII with pointed apices curving laterally; sterna more deeply impressed; median length of St VII shorter than that of St IV, V and VI combined. Spermatheca of *Granulaptera* type with duct length about 3 times bulb diameter (Fig. 63H).

MEASUREMENTS. Holotype ♂ first, then ranges of additional 2♂ and 2♀. L: 7.00, 7.17-7.33, 8.00-8.50; W: 3.50, 3.42, 4.25-4.33; HL: 1.92, 1.92-2.00, 2.00-2.08; HW: 1.72, 1.72, 1.88-1.96; PL: 0.8, 0.76-0.8, 0.9-0.92; PW: 2.32, 2.28, 2.60-2.68; AS: I, 0.68, 0.64-0.68, 0.70-0.74; II, 0.48, 0.46-0.48, 0.46-0.50; III, 0.62, 0.62, 0.60-0.70; IV, 0.50, 0.50-0.52, 0.50-0.54.

DISTRIBUTION (Fig. 65). Rainforest in lowlands and uplands of the Carbine Tableland and Cape Tribulation mountain massifs, N Queensland. It is one of only two apterous Aradidae known from the isolated rainforest on Baker's Blue Mountain in the rainshadow of the Carbine Tableland.

REMARKS. *G. verrucosa* has been chosen as type species because it shows several generalized features. These include the angulate margins of Cx VII (not seen in *G. remota* and *G. ovata*) and the non-narrowed prothorax (not seen in *G. spiniceps* and *G. alticola*). It is related to *G. tuberculata* but lacks the specialized narrowing of abdominal sterna in the ♀ of that species. It is also most common at low altitudes whereas *tuberculata* is strictly a mountain species.

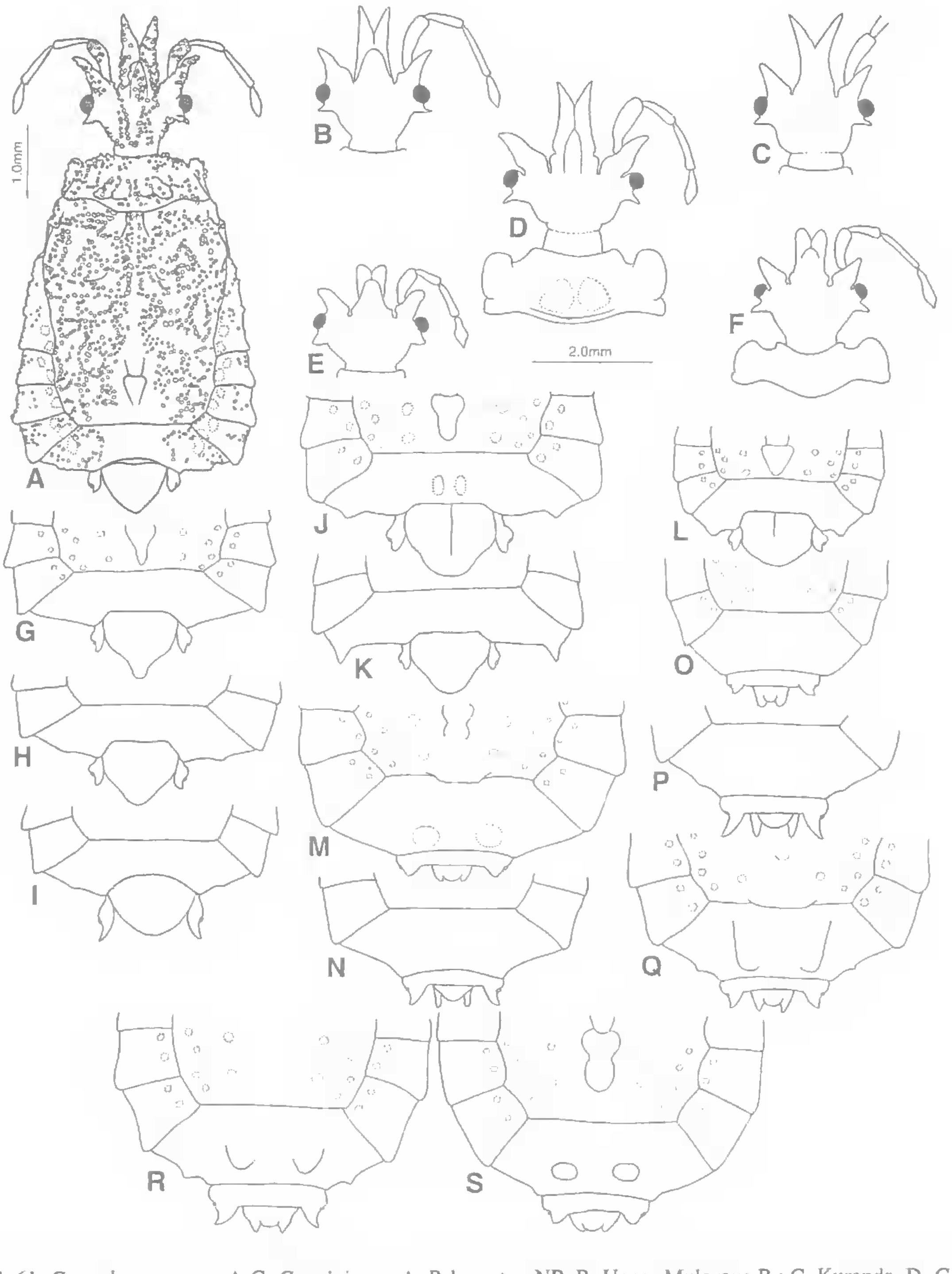

FIG. 61. *Granulaptera* spp., A-C, *G. spiniceps*; A, Palmerston NP; B, Upper Mulgrave R.; C, Kuranda. D, *G. alticola*. E, *G. tuberculata*. F, *G. remota*. G-L, ♂ dorsal abdominal apices. G-I, *G. spiniceps*. G, Upper Mulgrave R. H, Cooper Ck. I, Kuranda. J,K, *G. alticola*. J, Palmerston NP. K, Mossman Gorge. L, *G. tuberculata*. M-S, ♀ dorsal abdominal apices; M,N, *G. alticola*. M, Malanda. N, Mossman Gorge. O, *G. tuberculata*; P,Q, *G. spiniceps*. P, Kuranda. Q, Upper Mulgrave R. R, *G. verrucosa*. S, *G. remota*.

Granulaptera ovata sp. nov.
(Figs 5R, 62, 63D,I,Q)

TYPE. Holotype ♂, Crystal Cascades, via Cairns, N Qld. 8.viii.1966, G. Monteith, QMT11685.

MATERIAL EXAMINED. Holotype and 103 paratypes: NORTH QUEENSLAND: Crystal Cascades, via Cairns, 1♂ 2♀, 8.viii.1966, GBM, 3♂, 9.xii.1964, GBM, 1♂, 21.x.1980, GBM; Davies Creek Rd, 750m, 10♂ 2♀, 17.xii.1989, GBM, GIT; Lamb Ra., 19km SE Mareeba, 1200m, 3♂, 11.xii.1988, GBM & GIT; Mt Edith, 3,500', 2ml N of Tinaroo Dam, 1♂ 1♀, 2.vi.1972, GBM, 1♂ 1♀, 1050m, 12.x.1982, GBM, DKY & GIT; Kauri Creek, Tinaroo Dam, 3♂ 1♀, 24.iv.1970, GBM; Tolga, 5♂ 2♀, 10.v.1970, GBM; Lake Eacham, 19♂ 12♀, 24.iv.1970, GBM; Curtain Fig, 2km SW Yungaburra, 700m, 1♂, 8.xii.1988, GBM & GIT; Upper Mulgrave River, 3♂ 3♀, 13.xii.1966, BKC, 2♂ 2♀, 25.iv.1968, GBM, 1♂ 1♀, 26-27.xii.1967, in QM; Kearney's Falls, Upper Mulgrave, 100m, 15♂ 3♀, 10.xii.1988, GBM & GIT; 2km N Kearney's Falls, 200m, 2♂, 10.xii.1988, GBM & GIT; Mulgrave R., 7km SW Bellenden Ker, 60m, 1♂ 1♀, 2.iv.1984, AC & TAW, in ANIC. (QM duplicates lodged in BMNH, ANIC, MDPI, UQIC, DJ, SAM, EH, NMNH, HUB, HNHM) (paratypes: QMT14448-14511, QMT14516-14540).

DESCRIPTION. Small, 5.8-7.5mm long, dark, subcircular, with short antennal vestiture and open rostral groove.

MALE. Head about as wide as long, its dorsum rugose and granular with sparse setae; postocular tubercles small, cylindrical, pointed, usually not reaching outer profile of eyes; eyes sessile, cleft separating them from antenniferous tubercles almost occluded; antenniferous tubercles granular, straight, blunt, extending beyond eyes by distance equalling about 1½ eye diameters; genal processes short, blunt, lateral margins strongly divergent, apices well separated. Rostral groove open posteriorly. Antennae about 1.25 times head length; segment III longest, more than 1.5 times length of segment II.

Pronotum width 2.9-3.3 times median length; median longitudinal sulcus narrow, bordered by two curved rows of close packed granules; submedian areas raised into prominent, blunt tubercles, each with a glabrous disc on mesal face; sublateral areas flat, granular; anterolateral angles of pronotum bearing small, semicircular, semi-erect, explanate lobes a little larger than an eye and extending posteriorly only ½ length of pronotal margin. Mesonotum with scutellar region elevated into a median ridge continuing posteriorly to abdominal Tg I, ridge with longitudinal groove devoid of granules. Metanotum with sublateral areas slightly inflated, granular, with smooth zone extending along anterior margin and then posteriorly. Legs bicoloured; femora dark with pale median bands; tibiae pale with dark median bands; vestiture short, curled.

Abdominal tergal disc weakly elevated, with shining granules forming circles around positions of glabrous areas; scent gland scar forming a median tubercle and a posterior flavous scar; anterior to scent gland scar is a median, smooth, oval area devoid of granules; Cx margin of all abdominal segments continuous, unlobed and not angulate. Paratergites of VIII short, clavate, with mesal side of apices produced. Sterna with pattern of glabrous areas well marked; St II-VI with weak median impressions; St III-V of equidistant median length; St VII flat, smooth medially, wrinkled laterally. Parameres as in Fig. 63Q.

FEMALE. As for ♂ except: Abdominal tergal disc elevated along posterior margin; Tg VII with quadrate elevation and a posterior pair of tubercles; paratergites of VIII pointed; midline of St VII longer than that of V and VI combined. Spermatheca of *Granulaptera*-type, with proxi-

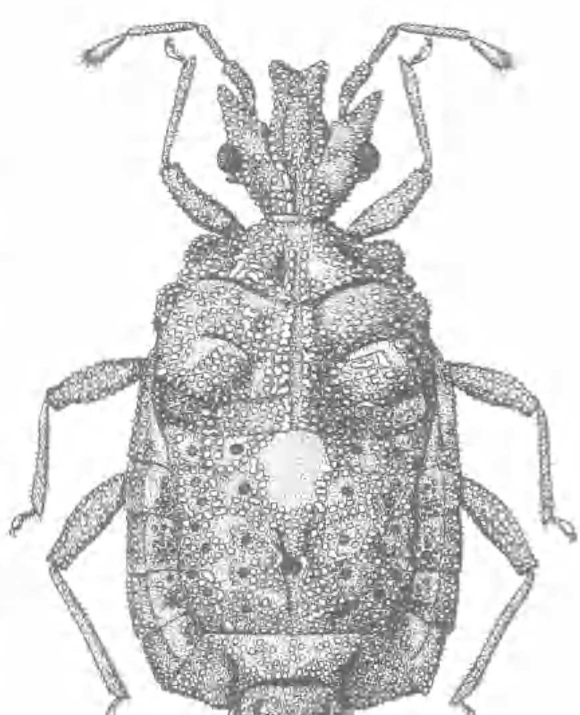

FIG. 62. Dorsal view of ♂ holotype of *Granulaptera ovata*.

DJC, GIT, RS, HJ; Windsor Tabld, 28km NNW Mt Carbine, 900m, 1♂, 15-18.iv.1982, GBM, DKY & DJC, in QM. (QM duplicates lodged in BMNH, MDPI, UQIC, DJ, SAM, EH, NMNH, HNHM) (paratypes:

low, parallel, longitudinal ridges on middle above pygophore. Paratergites of VIII clavate, with mesal side of apices slightly produced. Abdomimal part of duct thick-walled, leading to an inflated bulb in duct (Fig. 63I).

MEASUREMENTS. Holotype ♂ first, then ranges of additional 2♂ and 2♀. L: 6.67, 5.83, 7.33-7.50; W: 3.42, 2.92-3.08, 4.17-4.33; HL: 1.72, 1.56-1.64, 1.80-1.88; HW: 1.64, 1.52, 1.76-1.80; PL: 0.76, 0.60-0.64, 0.76-0.80; PW: 2.20, 1.84-1.92, 2.52-2.56; AS: I, 0.56, 0.52-0.60, 0.60-0.64; II, 0.38, 0.40, 0.44-0.46; III, 0.66, 0.56-0.60, 0.70-0.74; IV, 0.54, 0.44-0.50, 0.46-0.50.

DISTRIBUTION (Fig. 65). Highland and lowland rainforests from Cairns to the Mulgrave River and inland to the Lamb Range on the extreme N Atherton Tableland, N Queensland.

REMARKS. This is a common, distinctive species with a very restricted range of about 50km diameter in N Queensland. Neither it nor a complementary relative occur in the extensive Mossman-Cooktown rainforest complex to the north, or in the S Atherton Tableland-Mt Spec region S of its range. However, a very close relative, *G. remota*, sp. nov. is known from the Bulburin State Forest more than 1000km further south.

Granulaptera remota sp. nov.
(Figs 61F,S, 63R)

TYPE. Holotype ♂, Forest Station 2,000', Bulburin State Forest, via Many Peaks, Queensland, 2-5.iv.1972, G.B. Monteith, QMT11686.

MATERIAL EXAMINED. Holotype and 6 paratypes: SOUTH QUEENSLAND: Forest Station, 2,000', Bulburin SF, via Many Peaks, 1♂ holotype 4♀ paratypes, 2-5.iv.1972, GBM; Granite Creek, 700', Bulburin SF, 1♂ 1♀ 1.iv.1972, GBM, in QM. (QM duplicate lodged in BMNH) (QMT30091-30095).

DESCRIPTION. Small, 5.8-7.3mm long, dark, subcircular, with long antennal vestiture and open rostral groove. This species is very similar to *G. ovata*, and the following description is restricted to the differences from that species.

Head with posterior 1/2 of dorsum inflated; postocular tubercles longer, reaching outer profile of eyes; antenniferous tubercles apically more acute; genal processes more parallel-sided. Antennae longer, more than 1.35 times head length; segments II and III with erect setae as long as diameter of segments.

Pronotum with submedian elevations lower; antero-lateral explanate lobes larger, three times size of an eye, reaching almost to posterior pronotal angles. Median groove of scutellar ridge shallower, less distinct. Scent gland tubercle lower. Hind margin of Cx VI contrastingly pale. St VII of ♂ with central area smooth and shining. Legs with long erect setae on femora and tibiae. Parameres as in Fig. 63R.

MEASUREMENTS. Holotype ♂ first, then ranges of additional 1♂ and 2♀. L: 6.33, 5.83, 6.50-7.33; W: 3.33, 3.33, 3.67-4.25; HL: 1.76, 1.64, 1.72-2.00; HW: 1.56, 1.48, 1.56-1.72; PL: 0.72, 0.60, 0.64-0.76; PW: 2.20, 2.12, 2.20-2.52; AS: I, 0.60, 0.58, 0.66-0.78; II, 0.48, 0.46, 0.48-0.54; III, 0.76, 0.74, 0.74-0.78; IV, 0.56, 0.54, 0.60.

DISTRIBUTION (Fig. 65). Vicinity of the type locality in Bulburin State Forest, an isolated rainforest tract SW of Gladstone, S Queensland; high and low altitudes.

REMARKS. This species is a disjunct, southern outlier of *Granulaptera* and its close relationship to *G. ovata* indicates that the 2 are remnants of the same original stock. It is treated as a separate species because of the numerous minor, though consistent, differences referred to in the key and description. Its presence at the Bulburin State Forest accords with the relictual nature of other components of the flora and fauna of this interesting, isolated rainforest tract.

Granulaptera alticola sp. nov.
(Figs 61D,J-K,M-N, 63C,G,M)

TYPE. Holotype ♂, Palmerston Nat. Pk, via Innisfail, N Qld., 23.iv.1968, G.B. Monteith, QMT11687.

MATERIAL EXAMINED. Holotype and 165 paratypes: NORTH QUEENSLAND: Black Mtn, 17km ESE Julatten, 800-1000m, 9♂ 9♀, 29-30.iv.1982, GBM, DKY & DJC; Lamb Range, 19km SE Mareeba, 1100-1200m, 4♂ 1♀, 11.xii.1988, GBM & GIT; Lambs Head, 10km W Edmonton, 1200m, 1♂, 12-13.xii.1988, GBM & GIT, 5♂ 1♀, 10-12.xii.1989, gbm, git,hj; Davies Creek Rd, 750m, 3♂ 1♀, 17.xii.1989, GBM,GIT Lambs Head (east end), 1180m, 1♂ 3♀, 29.xi.1993, GBM,DJC,HJ; Mt Williams, 100-500m, 1♂ 3♀, 21.xii.1993, GBM,DJC,HJ;Chujeba Peak, 1000m, QMBerl.837, 1♂, 16.xii.1989, GBM, GIT; Baldy Mtn Road, 5 ml. SW. of Atherton, 4,000', 2♂ 3♀, 11.v.1970, GBM, 2♂ 1♀, 1000m, 10.x.1980, GBM, 3♂ 1♀, 1150m, 9.xii.1988, GBM & GIT, 1♀, QM Berl, 818, 5.xii.1988, GBM,GIT; Lake Eacham, 1♂, 8.x.1980, GBM; Bellenden Ker Ra., 0.5km S Cable tower 7, 500m, 1♂ 1♀, 25-31.x.1981, Earthwatch/QM; North Bell Peak, 20km S Cairns, 900-1000m, 2♂ 1♀, 15-16.x.1981, GBM & DJC 1♂, 13.x.1982, GBM, DKY

& GIT, in QM; Wongabel SF, 6km S Atherton, 1♀, 21.vi-26.vii.1984, RIS & J. Brown, in MDPI; Gadgarra Road, 700m, 3♂ 2♀, 9.xii.1989, GBM, GIT, HJ; Zillie Falls, 750m, 1♂ 1♀, 1.i.1990, GBM; Tower S of Crater NP, 1230m, QM Berl.878, 1♀, 23.xi.1994, GBM, 1♂, QM Berl. 886, 16.v.1995, GBM; Upper Plath Road, 1100m, 2♂, 8.ii.1996, GBM; Hugh Nelson Ra, 21km S Atherton, 1100m, 1♂ 1♀, 5.xi.1983, DKY & GIT; Crater NP, 1♂, 25.iv.1970, GBM; Sluice Creek Rd., East Evelyn, 2♀, 5.vi.1972, GBM; Malanda, 3♂ 1♀, 16.vi.1971, GBM; Malanda Falls, 750m, pitfall trap, 3♂, 9.xii.1989-14.i.1990, GBM, GIT, HJ; Massey Range, 6km NW Bellenden Ker Centre Peak, 1150m, 2♂ 1♀ 1N, 11-12.x.1991, GBM, DJC, HJ; Maalan Rd, 2km S Palmerston HWY, 750m, 1♂ 1♀, 18.v.1995, GBM; Mt Bartle Frere, west side, 1000-1400m, 2♂ 4♀, 7.x.1980, GBM & SRM; Boonjie, 13km ESE Malanda, 700m, 1♂, 8.xii.1988, GBM & GIT; Millaa Millaa Falls, 1♀, 23.iv.1968, GBM; Palmerston NP, 3♂ 4♀, 23.iv.1968, GBM; Henrietta Ck, Palmerston NP, 5♂ 1♀, 5.xii.1965, GBM, 1♂, 15.ix.1984, GBM, 5♂ 2♀, 2.i.1990, GBM; Mt Fisher (Whiteing Rd), 7km SW Millaa Millaa, 1000-1200m, 2♂ 3♀, 5.v.1983, GBM & DKY, 7♂ 2♀, 27-29.iv.1982, GBM, DKY & DJC; Mt Fisher (Kjellberg Rd), 1100m, QM Berl. 889, 3♂ 3♀, 17.v.1995, GBM; Sluice Ck Rd, East Evelyn, 3500', 2♀, 5.vi.1972, GBM & SRM; Mt Father Clancy, 9km S Millaa Millaa, 900-1000m, 2♂ 2♀, 6.xii.1988, GBM & GIT; Upper Boulder Ck, 11 km NNW Tully, 1000m, 1♀, 16-19.xi.1984, GBM & GIT, 5♂ 5♀, 5-7.xii.1989, GBM, GIT, HJ; Vine Creek Rd, 1100m, 5♂ 2♀, 24.xi.1994, GBM; Graham Range, 550m, 1♂ 1♀, 8-9.xii.1995, GBM, GIT, DJC, in QM. The following are not paratypes: 7km N Mt Spurgeon, 1200-1250m, 3♂ 3♀, 17-19.x.1991, GBM, DJC, HJ, LR; Stewart Cr, 4km NE Mt Spurgeon, 1250-1300m, 1♂, 15-20.x.1991, GBM, DJC, HJ, LR; Roots Ck-Francis Ck divide, 1250m, 1♀, 28.xi.1990, GBM, DJC, GIT, RS, HJ; Pauls Luck-Doolins Ck, 1100m, 1♂, 30.xi.1990, GBM, DJC, GIT, RS, HJ; Pauls Luck, 1100m, 1♂, 28-30.xi.1990, GBM, GIT, DJC, RS, HJ; Devil's Thumb, 10km NW Mossman, 1000-1180m, 1♂, 9-10.x.1982, GBM, DKY & GIT; Mossman Bluff, 11km W Mossman, 800-1300m, 2♂, 2.xi.1983, GBM, DKY & GIT, 1♂, 17-19.xii.1988, GBM & GIT; Mossman Gorge NP, 4♂ 1♀, 9.viii.1966, GBM, 1♂, 10.viii.1968, BKC, 1♂, 20.x.1980, GBM; O'Donoghue's Falls, 150m, 1♂ 2♀, 15-16.v.1995, GBM, T. Ford & D. Slaney; Mt Lewis, 3,500-4,000', via Julatten, 3♂ 1♀, 27-28.xi.1965, GBM, 3♂, 4.v.1970, GBM, in QM, 1♂, 960m, 30.x.1976, Taylor & TAW, in ANIC, 1♀, 12.x.1980, GBM; 2.5km N Mt Lewis, 1040m, 1♂ 1♀, 3.xi.1983, DKY & GIT; Mt Lewis summit, 1200m, 3♀, 9-10.xi.1981, GBM & DJC; 7.5km N Mt Lewis, 1200m, 2♂, 8.ix.1981, GBM & DJC; 10km N Mt Lewis, 1♀, 25.xi.1990, GBM, DJC, GIT, RS, HJ; Windsor Tabld, 28km NNW Mt Carbine, 900m, 1♂, 15-18.iv.1982, GBM, DKY & DJC, in QM. (QM duplicates lodged in BMNH, MDPI, UQIC, DJ, SAM, EH, NMNH, HNHM) (paratypes: QMT14222-14227, QMT14233-14239, QMT14241, QMT14245-14265, QMT14273-14277, QMT14286-14301, QMT14303-14308, QMT14313-14331, 14333-14373, QMT14378-14381, QMT14389-14396, QMT22269-22378, QMT25568-25576, QMT30090).

DESCRIPTION. Moderate-sized, 8-10.00mm long, dark, with narrowed prothorax bearing large explanate lobes, with erect setae on antennae.

MALE. Head length about 1.1-1.21 times width, its dorsum with granules and setae; postocular tubercles narrow, apically acute, directed posterolaterally, usually reaching outer profile of eyes; eyes well-exserted, cleft between them and antenniferous tubercles deep and rather wide for the genus; antenniferous tubercles long, divergent, outer margins slightly curved, apices pointed, extending beyond eyes by about 2 eye diameters; genal processes long, parallel-sided or slightly divergent, pointed, separated by a deep median cleft. Rostral groove closed behind. Antennal length from 1.1 to 1.3 times head length; segment I longest, segments II and IV subequal, segment III longer than II; segments I-III with long erect setae.

Pronotum noticeably narrower than hind body, about 2.8-3.00 times as wide as long; median longitudinal sulcus distinct, bordered by 2 rows of granules; submedian areas with large glabrous discs which are slightly elevated laterally; sublateral areas with a small longitudinal row of setose granules; anterolateral angles bearing large, explanate lobes, each a little more than 3 times size of an eye; lobes bearing erect marginal setae; posterior pronotal margin slightly convex, unbordered. Mesonotum with scutellar area raised into a rather narrow ridge continuing posteriorly to abdominal Tg I, ridge with median, longitudinal groove devoid of granules. Metanotum slightly inflated laterally with a smooth, glabrous area along anterior margin and angled obliquely across inflated regions. Legs bicoloured, femora pale with dark bases, tibiae largely pale; femora and tibiae with long erect setae.

Abdominal tergal disc not inflated, with shining granules forming circles around positions of glabrous areas; scent gland scar forming a setose tubercle with posteriorly a pale, triangular callus. Margins of Cx II-VI not lobed or angled, those of VII with a faint angulation; Tg VII with a pair of low, parallel, longitudinal ridges on middle above pygophore. Paratergites of VIII clavate, with mesal side of apices slightly produced. Abdominal sterna not deeply impressed with pattern of glabrous areas; median region of St VII dark, flated bulb in duct (Fig. 63I).

MEASUREMENTS. Holotype ♂ first, then

shallower, less distinct. Scent gland tubercle lower. Hind margin of Cx VI contrastingly pale. St VII of ♂ with central area smooth and shining.

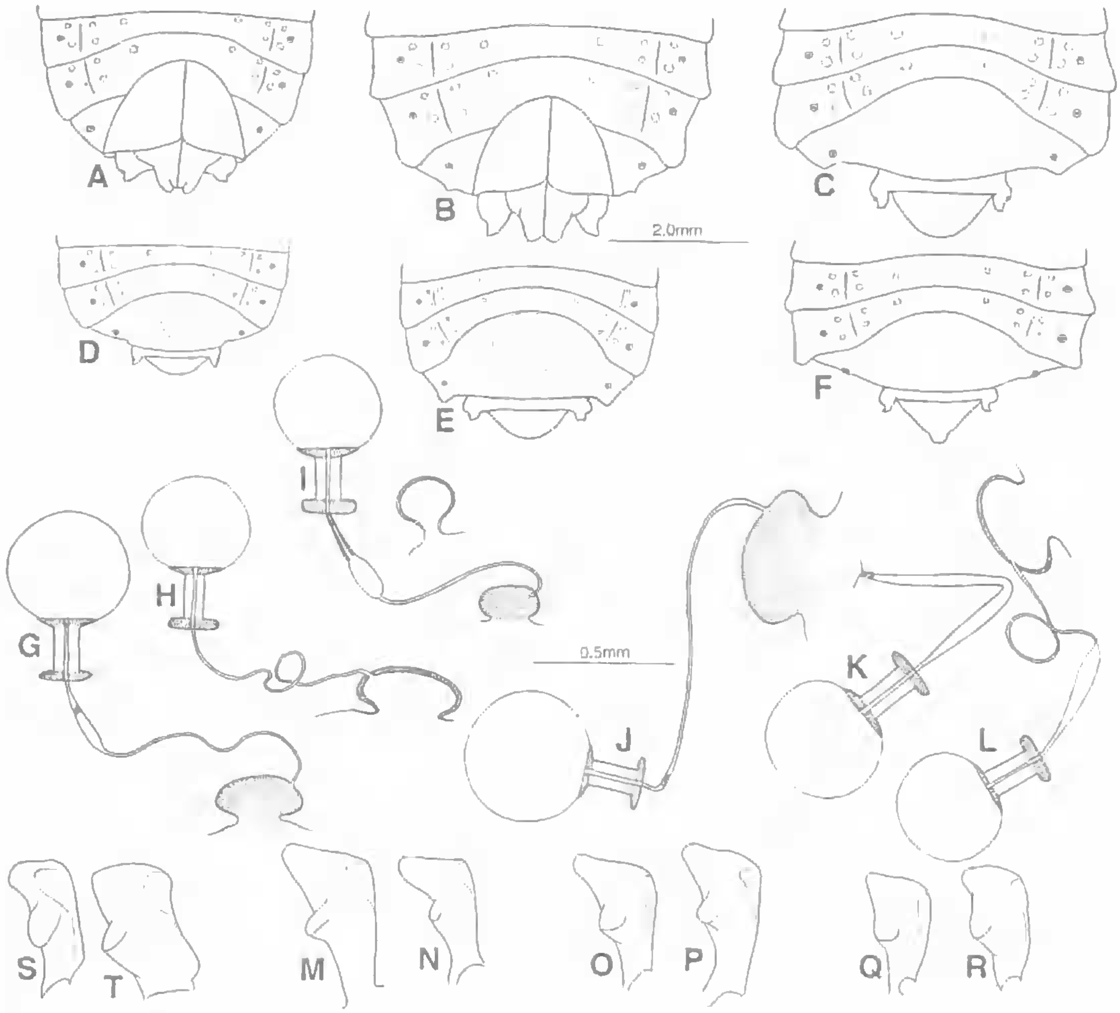

FIG. 63. A-R, *Granulaptera*, *Phloeobia* and *Woodwardiessa* spp.; A-F, ventral abdominal apices; A, *G. tuberculata* ♀; B, *G. verrucosa* ♀; C, *G. alticola* ♂; D, *G. ovata* ♂; E, *G. tuberculata* ♂; F, *G. spiniceps* ♂; G-L, spermathecae; G, *G. alticola*; H, *G. verrucosa*; I, *G. ovata*; J, *G. tuberculata*; K, *P. sayi*; L, *G. spiniceps*; M-T, left parameres, outer view; M, *G. alticola*, N, *G. tuberculata*; O, *G. spiniceps*; P, *G. verrucosa*; Q, *G. ovata*; R, *G. remota*. S, *P. sayi*; T, *W. quadrata*.

polished, with a few raised granules. Parameres as in Fig. 63M.

FEMALE. As for ♂ except: Posterior portion of abdominal tergal disc quadrately elevated in midline and overhanging suture between Tg VI and VII; Tg VII with quadrate elevation and 2 posterior, setose tubercles. Paratergites of VIII pointed; St VII longer than median lengths of III, IV and V combined. Spermatheca of *Granulaptera* type; duct with slight thin-walled dilation in proximal third; length of duct about 2½ bulb diameters (Fig. 63G).

MEASUREMENTS. Holotype ♂ first, then ranges of additional 2♂ and 2♀. L: 8.33, 8.00-8.33, 9.0-9.67; W: 4.17, 4.08-4.17, 5.17-5.42; HL: 2.32, 2.16-2.20, 2.32-2.40; HW: 1.92, 1.88-1.92, 2.00-2.20; PL: 0.84, 0.80-0.84, 0.92-0.96; PW: 2.53, 2.40, 2.72-2.88; AS: I, 0.86, 0.80-0.88, 0.84-0.98; II, 0.54, 0.52-0.58, 0.60-0.66; III, 0.66, 0.70-0.74, 0.76-0.80; IV, 0.48, 0.54-0.58, 0.54.

DISTRIBUTION (Fig. 65). Mountain rainforests from the Walter Hill Range north to the Windsor and Carbine Tablelands, N Queensland.

REMARKS. This species is related to *G. cooki* and to the variable, *G. spiniceps*, and shares the same characteristic narrow prothorax and truncate abdominal apex as in those species. *G. alticola* and *G. spiniceps* show a complex interrelated distribution pattern with *G. alticola* predominating at higher elevations and *G. spiniceps* commonest at low elevations. However, they are sympatric at many localities and where this occurs the 2 may be found in mixed gregarious colonies. South of Cairns the 2 are sympatric over most of the range of *G. alticola* on the Atherton Tableland but, whereas *G. spiniceps* is widely distributed on adjacent lowlands also, *G. alticola* does not occur below about 700m altitude.

Specimens from the mountains behind Mossman which are here referred to *G. alticola* differ slightly from material from further south and are excluded from the paratype series. All have the prothoracic lobes smaller (about twice size of eye) and some ♂ have a prominent pointed appendage to the margin of Cx VII. At the seaward foot of the steep coastal mountains in this region *G. alticola* occurs down to 100m altitude in Mossman Gorge.

Granulaptera cooki sp. nov.
(Fig. 64)

TYPE. Holotype ♂, Mt Finnigan, 850-1100m, 37km S Cooktown, N. Qld., 19-22 Apr., 1982, RF, Monteith, Yeates & Cook, QMT11830.

MATERIAL EXAMINED. Holotype and 13 paratypes: NORTH QUEENSLAND: Mt Finnigan, 37km S Cooktown, 850-1100m, 6♂ 2♀, 19-22.iv.1982, GBM, DKY & DJC, 1♀, 1100m, 28-30.xi.1985, GBM, DJC LR, 2♂ 3♀ 3N, 3-5.xii.1990, GBM, GIT, DJC, RS, LR, in QM. The following 30 specimens are not paratypes: Mt Hartley, 790m, 6♂ 1♀, 8.xi.1995, GBM, DJC, LR, HJ; 2.5km SW Mt Hartley, 35km S Cooktown, 1♀, 23-24.iv.1982, GBM, DKY & DJC; Mt Sorrow, 300-800m, 5km W Cape Tribulation, 1♀, 15.x.1980, GBM; Mt Pieter Botte, 950m, 5♂ 7♀, 21.xi.1991, GBM,DJC,HJ,LR; Mt Halcyon, 870m, 22-24.xi.1993, GBM,DJC,LR,HJ; Mt Hemmant, 1050m, 1♂ 1♀, 25-27.xi.1993, GBM, DJC, LR, HJ; Roaring Meg Valley, 720m, 2♂, 22.xi.1993, GBM, DJC, LR, HJ; Cooper Ck, 18ml N Daintree R., 20m, 1♀, 21-22.vi.1969, GBM, 1♀, 2.v.1970, GBM; Thornton Peak, 700-1000m, 3♀, 22.ix.1981, GBM & DJC. (QM duplicates lodged in BMNH, ANIC, EH) (paratypes: QMT14407-14409, QMT14411-14420).

DESCRIPTION. Large, 9.3-11.5mm long, dark, with very attenuate genal processes and with erect setae on antennae.

MALE. Head length 1.36-1.42 times width, its dorsum with granules and long, erect setae; postocular tubercles short, narrow, triangular, directed laterally, usually not reaching outer profile of eyes; eyes small, exserted, cleft between them and antenniferous tubercles deep and wide; antenniferous tubercles very long, divergent, tapering to acute apices, outer margins somewhat curved, extending beyond eyes by about 3-4 eye diameters; genal processes extremely long, fused for a short distance in front of clypeus, then separate and divergent, reaching to beyond 1/2 length of antennal segment II. Rostral groove closed behind. Antennal length 0.86-0.95 times head length; segment I longest, segments II and IV subequal, segment III longer than II; segments I-III with long, erect setae.

Pronotum transverse, much narrower than hind body, about 2.7-3.00 times wider than long; median longitudinal sulcus faint, bordered by 2 rows of granules; submedian areas poorly defined and faintly raised but with glabrous discs distinct; sublateral areas with faint, irregular, granular swellings; anterolateral angles of pronotum with well-developed, explanate lobes, projecting forward, each about 2-3 times the size of eye, bearing long erect setae; posterior pronotal margin faintly convex, unbordered. Mesonotum with a weak median elevation, continuing posteriorly to Tg I, its midline devoid of granules. Metanotum slightly inflated and granular laterally, inflated area with an oblique strip bare of granules. Legs not bicoloured; femora and tibiae with long erect setae.

Abdominal tergal disc flat, with shining granules forming circles around glabrous areas; scent gland scars with a setose anterior tubercle anterior to a pale triangular callus. Margins of Cx II-VI not angled or projecting, forming a straight line continuous with margin of thorax. Margin of Cx VII straight, giving strongly truncate appearance to hind body. Tg VII faintly elevated in front of pygophore. Paratergites of VIII drawn out into attenuate, setose points beyond the spiracle. Abdominal sterna weakly impressed with pattern of glabrous areas; median area of St VII flat and smooth; spiracles of VII ventrally placed, far from margin.

FEMALE. As for ♂ except: posterior midline of abdominal tergal disc elevated and overhanging suture between Tg VI and VII; Tg VII quadrately raised with 2 irregular posterior tubercles; posterolateral angles of Cx VI usually projecting a little; St VII medially longer than V and VI combined.

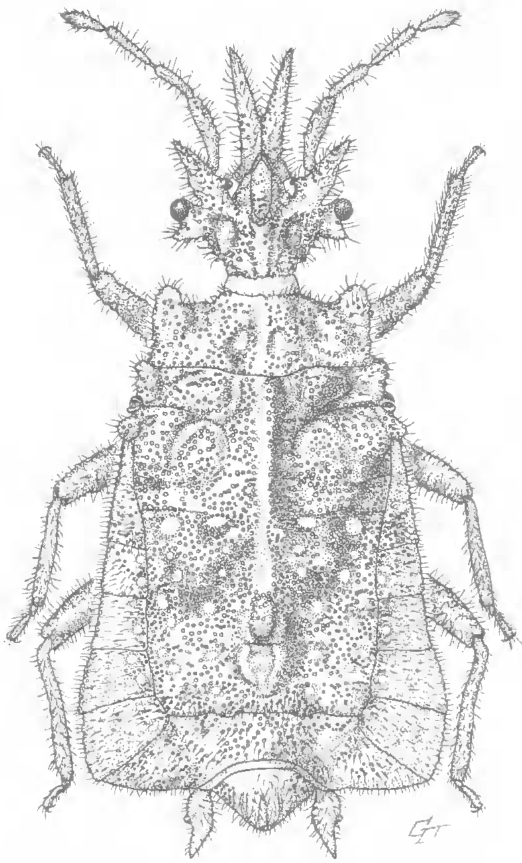

FIG. 64. Dorsal view of ♂ *Granulaptera cooki*.

MEASUREMENTS. Holotype ♂ first, then range of 2♂ and 2♀ paratypes. L: 9,30, 9,37-10.00, 10.75-11.50; W: 4.50, 4.40-4.50, 4.75-5.58; HL: 3.16, 3.00-3.33, 3.19-3.40; HW: 2.25, 2.20-2.34, 2.34-2.50; PL: 1.00, 0.90-0.93, 0.94-1.05; PW: 2.65, 2.65-2.81, 2.81-3.00; AS: I, 0.90, 0.94-1.00, 1.02-1.03; II, 0.53, 0.56-0.60, 0.62-0.66; III, 0.75, 0.76-0.78, 0.78-0.80; IV, 0.56, 0.53-0.56, 0.56-0.58.

DISTRIBUTION (Fig. 65). From Mt Finnigan in the N along the coastal ranges S to Thornton Peak, N Queensland.

REMARKS. This is the largest species of *Granulaptera* and the one with the most spectacular development of attenuate head processes. It is named for Doug Cook whose bushcraft has been invaluable on many collecting trips with the author in search of aradids in remote places. It is a northern derivative of *G. alticola* but its striking appearance sets it apart.

G. cooki is commonest on the summit plateau of Mt Finnigan. Specimens from elsewhere within its quite small geographic range vary a little, with slightly lesser development of head processes, and are not included in the paratype series. The species is restricted to high altitudes except for 2 collections at virtual sealevel at Cooper Creek just S of Cape Tribulation. These Cooper Creek ♀ are the only specimens of *G. cooki* recorded from lowlands but since the locality is at the base of high mountains they may represent temporary establishment in lowlands after being carried downstream by the torrential rains typical of the region (Monteith, 1985).

Granulaptera spiniceps sp. nov.
(Figs 61A-C,G-I,P-Q, 63F,L,O)

TYPE. Holotype ♂, Upper Mulgrave River, via Gordonvale, N. Qld., 26-27.xii.1967, G. Monteith, QMT11688.

MATERIAL EXAMINED. NORTH QUEENSLAND: Holotype and 65 paratypes: Upper Mulgrave River, via Gordonvale, 1♂ holotype, 3♂, 26-27.xii.1967, GBM 13♂ 8♀, 30.iv.1970, GBM, 4♂, 15.viii.1966, GBM, 2♂ 1♀, 1-3.xii.1965, GBM, 1♂ 2♀, 25.iv.1968, GBM; Kearney's Falls, Upper Mulgrave, R., 100m, 14♂ 10♀, 10.xii.1988, GBM & GIT; 2km N Kearney's Falls, 200m, 3♂ 4♀, 10.xii.1988, GBM & GIT, in QM. 154 Non-type specimens as follows: Alexandra Bay, ANIC Berl. 328, 2♂ 1♀, 21.v.1971, Taylor & Feehan; Noah Creek, 16.07 S, 142.25E, ANIC Berl. 321, 1♂, 21.v.1971, Taylor & Feehan, 1♂, 27.iii.1984, A.Calder & TAW, in ANIC, 1♂, 16.x.1980, GBM, in QM; Cooper Creek, 18 ml. N. of Daintree River, 1♂, 2.v.1970, GBM, 1♂, 14.xi.1969, BKC; Black Mtn, via Kuranda, 1♂ 1♀, 31.vii.1956, T.E. Woodward, 1♂, 27.vii.1982, S&JP; Mt Formartine South, 700m, 3♀, 22-24.xi.1990, GBM, GIT, 1♂, QM Berl. 848, 24.xi.1990, GBM, GIT; Saddle Mtn, 640m, pitfall trap, 1♂, 10.xii.1995-7.ii.1996, GBM,DJC; 6 ml. W of Kuranda, 1♀, 8.viii.1966, GBM, in QM; 4km NNW Kuranda, 1♂, 6.xi-10.xii.1984, RIS & K. Halfpapp, in MDPI; Lake Eacham, 6♂, 24.iv.1970, GBM; Lake Barrine, 750m, QM Berl. 820, 1♂, 10.xii.1988, GBM; Malanda Falls, 750m, 1♀, 11.v.1970, GBM, 2♀, 8-12.x.1980, GBM, 2♂, 9.xii.1989-14.i.1990, GBM, GIT, HJ; Baldy Mtn Rd, 4,000', 5 ml. SW. of Atherton, 1♂, 11.v.1970, GBM, 1♀, 10.x.1980, GBM, 1♀, 1150m, 9.xii.1988, GBM & GIT; Crater NP, 2♀, 25.iv.1970, GBM, 1♀, 1000m, 5.xii.1988, GBM & GIT; Hugh Nelson Ra, 21km S Atherton, 1040-1100m, 1♂, 5.xi.1983, DKY & GIT, in QM, 1♀, 13.iii-1.v.1984, RIS & J. Brown, in MDPI; Bellenden Ker Ra., summit TV Stn. 1560m, 1♂, 10.iv.1979, GBM, 1♀, 1-7.xi.1981, Earthwatch/QM, 1♂ 1♀, 17.x-5.xi.1981, Earthwatch/QM; Bellenden Ker Ra., Cable Tower 3, 1054m, 4♂ 3♀, 17.x-5.xi.1981, Earthwatch/QM, 3♂, 12.iv.1979, GBM;

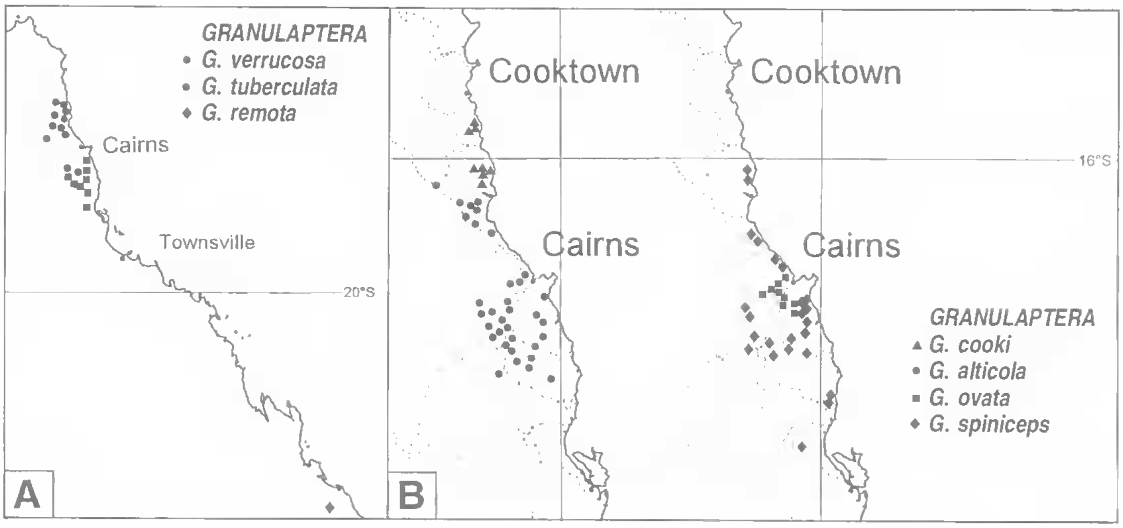

FIG. 65. Records for species of *Granulaptera* in northern Queensland.

Bellenden Ker Ra., Cable Base Stn., 100m, 5♂ 4♀, 17.x-9.xi.1981, Earthwatch/QM; Westgid Ck, nr Bellenden Ker, 100m, 1♂, 1.xi.1981, Earthwatch/QM; Graham Ra., nr Babinda, 6♂ 4♀, 9-10.iv.1979, GBM, 1♂, 550m, 8-9.xii.1995, GBM, GIT, DJC; Mt Bartle Frere, W side, 700-1000m, 1♂ 1♀, 7.x.1980, GBM & SRM, 2♀, QM Berl.815, 8.xii.1988, GBM, GIT, 2♀, 1000-1400m, 7.x.1980, GBM & SRM; Josephine Falls, 2♂ 5♀, 12.ii.1996, GBM; Boonjie, 13km ESE Malanda, 700m, 2♂ 1♀, 8.xii.1988, GBM & GIT; Major's Mtn, 7km SE Ravenshoe, 1000-1100m, 2♂ 1♀, 4.v.1983, GBM & DKY; Mt Fisher, 7km SW Millaa Millaa, 1200m, 1♀, 5.v.1983, GBM & DKY, 4♂, QM Berl.889, 17.v.1995, GBM; Mt Father Clancy, 9km S Millaa Millaa, 840m, 1♀, 4.v.1983, GBM & DKY, 3♂ 3♀, 900-1100m, 6.xii.1988, GBM & GIT, 1♀, QM Berl. 812, 6.xii.1988, GBM,GIT; Downey Ck, 25km SE Millaa Millaa, 400m, 3♂ 3♀, 7.xii.1988, GBM & GIT, 1♀, QM Berl.813, 7.xii.1988, GBM, GIT; Cardstone, 200m, 1♂, 10.v.1983, GBM & DKY, in QM; Tully Falls SF, 900m, 1♀, 5.xi-7xii.1988, RIS & Dickinson, in MDPI; The Boulders, Babinda, 2♂ 1♀, 7.viii.1966, GBM; Stone Creek, 100m, pitfall trap, 1♀, 1.xi.1995-6.ii.1996, JH; Henrietta Creek, Palmerston NP, 5♂ 3♀, 23.iv.1970, GBM, 2♂ 2♀, 5.xii.1965, GBM; Palmerston NP, 1♂ 3♀, 23.iv.1968, GBM, 2♂ 3♀, 7-8.viii.1968, BKC, 2♂, 2.i.1990, GBM, 2♂ 1♀, 9.xii.1995, GBM, GIT, DJC; Millaa Millaa Falls, 1♀, 23.iv.1968, GBM, 1♂, QM Berl. 888, 17.v.1995, GBM; Mission Beach, 1♂ 1♀, 7.xii.1965, GBM; Lacey's Creek, Mission Beach, 5♂, 21.iv.1970, GBM, 1♂ 1♀, 9.iv.1979, GBM; Kirrama SF, 650m, 1♂, 11.v.1983, DKY, 1♀, 500m, 2.x.1980, GBM, in QM. (QM duplicates lodged in BMNH, ANIC, UQIC, DJ, SAM, EH, NMNH, HNHM) (paratypes: QMT14552-14554, QMT14565-14570, QMT14576-14578, QMT14606-14625, QMT14701-14725).

DESCRIPTION. Small to moderate-sized, 6-9.1mm long, brown, with narrowed prothorax bearing small anterolateral lobes. This species varies considerably both individually and geographically; the following description refers to the holotype and paratypes from the Mulgrave River and variation will be discussed separately.

MALE. Head long, length 1.3 times width; dorsum with small granules and some curled setae; postocular tubercles short, apically acute, directed posterolaterally, not reaching outer profile of eyes; eyes moderately exserted, separated from antenniferous tubercles by a narrow cleft not reaching inner margin of eyes; antenniferous tubercles long, tapering rapidly to acute apices, with lateral margins slightly curved, extending beyond eyes by distance equalling 2 eye diameters; genal processes very long, strongly divergent, with apices acute. Rostral groove closed posteriorly. Antennal length 1.12 times head length; segment I longest, segment III longer than segment II; segments II and III with short adpressed setae.

Pronotum noticeably narrower than hindbody, its width 2.65 times median length; median longitudinal sulcus narrow, bordered by two rows of granules; submedian areas with glabrous discs large, elevated laterally into low oblique ridges converging anteriorly; sublateral areas each with a faint row of setose granules; anterolateral angles each bearing a small, explanate lobe barely larger than an eye. Mesonotum with scutellar ridge narrow, extending posteriorly to Tg I of abdomen. Metanotum with sublateral areas weakly inflated, each with a broad smooth area along anterior margin and extending posteriorly into middle of segment.

Abdominal tergal disc with many shining granules, uniformly distributed except forming indistinct circles around positions of glabrous areas; scent gland scar forming a median, setose tubercle and a posterior triangular scar. Posterolateral angles of Cx V and VI slightly produced and angulate; margin with Cx VII straight. Paratergites of VIII clavate, with mesal side of apices produced and acute. Pygophore with a posterior, median, downturned process. Abdominal sterna not distinctly impressed with glabrous area pattern; spiracles of segment VII displaced posteriorly to a position close to margin of body, making them almost visible from above. Parameres as in Fig. 63O.

FEMALE. As for ♂ except: Posterior portion of abdominal tergal disc elevated in midline and overhanging suture between Tg VI and vii; Tg VII with quadrate elevation and a pair of low posterior tubercles; paratergites of VIII elongate, acute, curved; St VII with median length equal to median lengths of IV, V and VI combined. Spermatheca of *Granulaptera* type, its duct with length about 2½ times bulb diameter, dilated over proximal third (Fig. 63L).

MEASUREMENTS. Holotype ♂ first, then ranges of additional 2♂ and 2♀. L: 7.83, 6.00-7.67, 7.33-9.17; W: 3.83, 3.08-3.92, 4.33-4.58; HL: 2.24, 1.60-2.20, 2.00-2.44; HW: 1.72, 1.44-1.72, 1.68-1.84; PL: 0.80, 0.60-0.76, 0.76-0.92; PW: 2.12, 1.80-2.12, 2.20-2.33; AS: I, 0.80, 0.68-0.82, 0.80-0.94; II, 0.54, 0.48-0.54, 0.54-0.66; III, 0.70, 0.62-0.76, 0.72-0.84; IV, 0.46, 0.38-0.48, 0.42-0.52.

DISTRIBUTION (Fig. 65). Widespread in rainforests of N Queensland from the Kirrama Range north to the Kuranda area beyond which there is a considerable hiatus in its distribution to an isolated population around Cape Tribulation. In the southern portion of its range it occurs widely at sealevel but is known from many localities on the Atherton Tableland and the Bellenden Ker range to a maximum altitude of 1,500m. At Cape Tribulation it is strictly lowland and is sympatric there with southern populations of *G. cooki*.

REMARKS. This species is widespread, common and variable. The variability occurs in overall size, in development of head processes and eighth paratergites, and in shape of abdominal apex. The situation is made more complex by the fact that while most variation is undoubtedly geographically induced there also seems to be a degree of polymorphism within some populations at the same locality. I have selected the type locality as the Mulgrave River since the abundant material available from this locality is quite uniform; only specimens from this region have been made paratypes. Without implying any taxonomic significance to the categories, I present some notes on the different 'forms' of *G. spiniceps*:

Typical form. Specimens from the type locality have genae long, with apices surpassing the length of the first antennal segment; the ♂ has posterolateral angles of Cx VI produced slightly, paratergites of VIII are relatively short, and the pygophore bears the apical downturned process. This form also occurs at: Cooper Creek, The Boulders, Palmerston National Park, Crater National Park and Lake Eacham.

Form A. Specimens with genal processes shorter than length of first antennal segment and less divergent than in typical form; posterolateral angles of Cx VI are often not produced and pygophore often does not have the apical process. This form occurs at the southern lowland localities of Lacey's Creek and Mission Beach. Additionally, about 1 in 3 of specimens from Palmerston National Park are best referable to this form.

Form B. In the Kuranda region specimens have extremely long, attenuate, curved paratergites of segment VIII in both sexes and the genal processes are more divergent than in the typical form.

THE STATUS OF *MICROMEZIRA* KORMILEV, 1967

Kormilev (1967b) erected a new genus and species in the Mezirinae, *Micromezira australis*, on the basis of a single brachypterous specimen from Australia in the British Museum. This species is here shown to be a synonym of a species of *Carventus* (Subfamily Carventinae) which Kormilev had described one year earlier. The synonymy for this species is as follows:

Subfamily CARVENTINAE Usinger & Matsuda, 1959

Carventus Stal, 1865

Carventus Stal, 1865: 32 (descr.); Kormilev & Froeschner, 1987: 72 (catalogue of spp.).

Micromezira Kormilev, 1967b: 488 (descr.); Kormilev, 1971: 7 (incl. in key); Kormilev & Froeschner, 1987: 160 (catalogue of spp.) *syn. nov.*

Carventus brachypterus Kormilev, 1966 (Fig. 66)

Carventus brachypterus Kormilev, 1966: 301 (descr., fig.); Kormilev, 1969: 52, 54 (incl. in key; listed); Kormilev & Froeschner, 1987: 73 (listed).

Micromezira australis Kormilev, 1967b: 490 (descr., fig.); Kormilev & Froeschner, 1987: 160 (listed). *syn. nov.*

TYPES. *Carventus brachypterus*: Holotype ♀, Manawah, Tasmania, A.M. Lea, SAM I20,298). Examined.

Micromezira australis: Holotype ♂, Sydney, NSW, 1900-1903, J.J. Walker, 1910-384, in BMNH. Examined.

REMARKS. Kormilev described *C. brachypterus* from a single ♀ from Tasmania. The species is now known to be widespread in Tasmania, Victoria, A.C.T., N.S.W., Queensland and the SW corner of W.A. (Monteith, unpubl. records). The unique holotype of *Micromezira australis* is an old ♂ specimen lacking the pygophore and some antennal segments but is still clearly identical with ♂ of *C. brachypterus* from Victoria. Its locality is given as Sydney but the collector, J.J. Walker, is known to have collected widely on the southern coast of New South Wales (Walker 1905). Kormilev's mistaken attribution of his genus *Micromezira* to the Mezirinae instead of the Carventinae becomes more understandable when the only specimen available to him is examined. The Carventinae differ from the Mezirinae by the lack of a distinct metathoracic scent gland opening and by the presence of a waxy surface secretion on the body. The surface secretion is very inconspicuous in *C. brachypterus* and in the specimen forming the type of *M. australis* it is almost transparent from age. Furthermore, the specimen has a slight split in the cuticle of the metapleuron and this is clearly the structure referred to as the '*metathoracic gland opening placed laterally near the border, just below wing pads*' in Kormilev's description of *Micromezira*. The specimen has, in fact, no visible metathoracic gland openings. Thus the genus *Micromezira* is excluded from the Mezirinae and falls as a synonym of *Carventus* in the Carventinae.

NON AUSTRALIAN MEZIRINAE. The following 2 apterous genera from New Caledonia and New Zealand are described to illustrate their close relationship to the complex of Australian apterous genera.

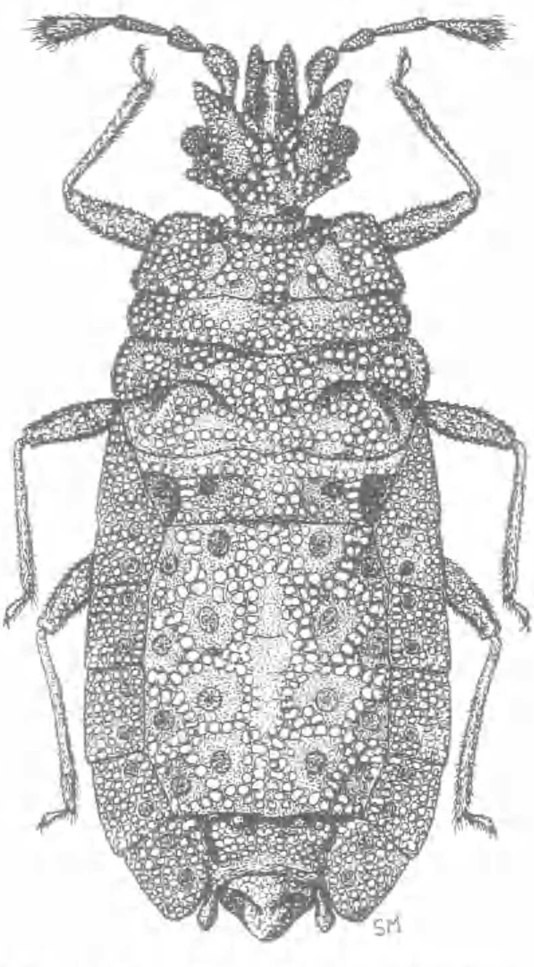

FIG. 66. Dorsal view of ♂ *Carventus brachypterus* (Halls Gap, Victoria).

Phloeobia Montrouzier, 1865

Phloeobia Montrouzier, 1865: 236 (descr.); Usinger and Matsuda, 1959: 236 (redescr.; incl. in key); Kormilev, 1971: 6 (incl. in key); Kormilev & Froeschner, 1987: 185 (catalog. of spp.).

TYPE SPECIES. *Phloeobia sayi* Montrouzier, 1864, by monotypy.

REMARKS. This monotypic genus, common and widespread on New Caledonia, was the first apterous aradid described in the world but its apterous condition was not realized until it was redescribed almost a hundred years later (Usinger

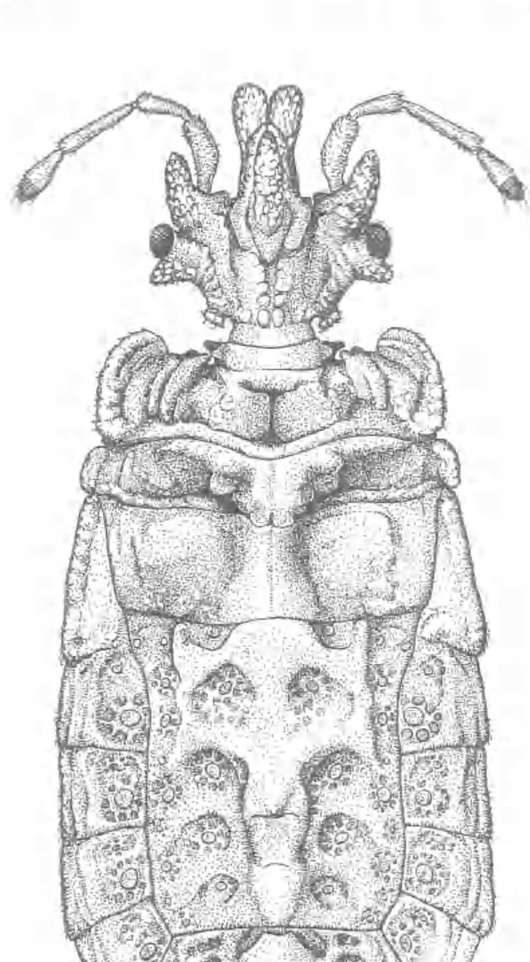

FIG. 67. Dorsal view of ♂ *Phloeobia sayi* (Col d'Amieu New Caledonia).

& Matsuda, 1959). A new description is given here comparing it with its close relatives in Australia.

DESCRIPTION (Figs 63K,S, 67). Moderate-sized, apterous, with smooth body surface. Head as long as wide, broad and flattened; postocular tubercles as triangular lobes; eyes rather sessile, separated from antenniferous tubercles by a narrow cleft; antenniferous tubercles with apices curved mesally; genal processes long, blunt, with bases fused anterior to clypeal apex; rostral groove open posteriorly; rostral atrium closed. Antennal segments II and III of lesser diameter than I and IV; segment III longer than II or IV.

Pronotum with a median, longitudinal sulcus and without elevations at submedian or sublateral positions; pronotal collar distinct and bearing dorsal and ventral opposable tubercles; anterolateral pronotal angles with explanate lobes whose lateral margins are continuous to posterolateral angles; hind margin of pronotum bordered medially. Scutellar region of mesonotum weakly elevated and continuous posteriorly to abdominal Tg I; weak opposable tubercles present on each side of scutellar elevation; meso and metanota without elevations laterad of median ridge. Legs bicoloured. Tarsal pulvilli present, spatulate.

Fused abdominal tergal disc smooth, nongranular, impunctate and with barely discernible pattern of glabrous areas; weak opposable tubercles present between sublateral areas of Tg I and II; suture between I and II distinct in middle and obliterated laterally; external margin of Cx VII lobed in ♂.

Meso- and metasterna with weak median impressions; pattern of glabrous areas clearly impressed on abdominal sterna; length of St VII of ♀ less than of V and VI combined.

Spermatheca and its duct not modified (Fig. 63K). Parameres with a row of fine teeth on inner face (Fig. 63S).

Woodwardiessa Usinger & Matsuda, 1959

Woodwardiessa Usinger & Matsuda, 1959: 215 (descr., incl. in key); Kormilev, 1971: 6 (incl. in key); Lee & Pendergrast, 1977: 173 (diagnosis); Kormilev & Froeschner, 1987: 196 (catalog. of spp.).

TYPE SPECIES. *Woodwardiessa quadrata* Usinger & Matsuda, 1959, by original designation.

REMARKS. This monotypic genus is the only apterous mezirine in New Zealand and is confined to the N portion of the North Island (Fig. 10D). It was described and figured by Usinger & Matsuda (1959) and Lee & Pendergrast (1977). A further definition is given here to place it in context of related genera from Australia and New Caledonia.

DESCRIPTION (Fig. 63T). Medium-sized, apterous, with open rostral atrium and distinct wing vestiges.

Head about as long as wide; postocular tubercles small, narrow, not reaching outer profile of eyes; eyes small, stylate, separated from antenniferous tubercles by a wide, deep cleft; antenniferous tubercles broad, divergent, apically blunt; genal processes small, parallel-sided, fused at bases anterior to clypeus. Rostral atrium broadly open; rostral groove not closed behind. Antennae long, with segments II and III of lesser diameter than I and IV; segment I exceeding apex of genal process; antennae with long erect setae.

Pronotum with median, longitudinal sulcus; submedian areas with flat glabrous discs; sublateral areas each with a low ridge; antero-lateral angles of pronotum with prominent explanate lobes which terminate posteriorly before hind pronotal angles; pronotal collar not defined by a groove and without dorsal and ventral opposable tubercles; hind margin straight, unbordered. Mesonotum with scutellum defined as a semicircular flat plate separated off by a complete posterior suture; a small lobe on each side of base of scutellum subtends an opposable tubercle mesally towards the scutellum; subquadrate hemelytral vestiges extend to posterior margin of mesonotum, defined by sutures but fused with surface of mesonotum. Legs setose, not bicoloured. Tarsal pulvilli present, spatulate.

Abdominal Tg I raised into a median, transverse elevation behind scutellar apex; suture between Tg I and II present medially and obliterated laterally; abdominal tergal disc with pattern of glabrous areas clearly defined by raised, setose ridges; intersegmental sutures between dorsal connexival plates strongly marked, each with an opposable tubercle developed at its mesal end and subtended against the lateral carina of the fused abdominal disc; lateral margins of Cx VII not lobed or angled in ♂ or ♀.

Meso- and metasterna with deep median impressions; pattern of glabrous areas strongly marked on abdominal sterna; spiracles of segments II-VI ventral, those of VII elevated on a posteriorly directed lateral tubercle and visible from above. Paratergites of VIII short, truncate. ♀ with median length of St VII longer than combined length of V and VI. Spermatheca with duct inflated in part. Parameres with a row of fine teeth on inner face (Fig. 63T).

DISCUSSION

DISTRIBUTION PATTERNS OF AUSTRALIAN MEZIRINAE. Because of the intensity of collecting over a long period of time we now have a very complete picture of the Australian species and their distributions. These distributions are given here in several ways: (1) Maps of extents of individual genera in Australia and adjacent land masses of the Indo-Pacific (Figs 8-10); (2) Maps of locality records for individual species in each genus (Figs 14, 17, 21, 25, 28, 30, 33, 35, 38, 45, 48, 52, 56, 59, 65); (3) Tabulations of the extent of species through defined regions along the eastern seaboard of Australia (Figs 68-70); and (4) Diagrammatic illustrations of the gradients of magnitude of various faunal components along the eastern seaboard (Figs 71-72).

The 91 species of 22 genera treated here show an extremely unequal distribution over the face of the continent, shown in the following breakdown in the number of genera and species recorded from each State:

	Genera	Species
Queensland	20	81
New South Wales	11	20
Victoria	3	3
South Australia	1	1
Western Australia	3	6
Northern Territory	3	3
Tasmania	2	2

One of the overriding dichotomies in the Australian biota is that existing between those animals and plants associated with rainforest (closed forest) and those associated with sclerophyllous open forests dominated by trees of the genera *Eucalyptus* and *Acacia*. Aradidae are humidity loving insects which feed on fungi in moist, decaying wood, reaching their greatest diversity in warm rainforests.Thus, even though rainforest covered only 1% of Australia's land surface at the time of European discovery, it is significant that 75% of its Mezirinae are restricted to this vegetation type (Figs 69,70). The distribution and evolution of the mezirine fauna is thus inextricably linked to history of rainforest on the continent.

While the modern open forest flora mostly evolved on the Australian plate during the aridity of the late Tertiary, the rainforests have a dual origin. They have an old element exemplified by the conifers, primitive angiosperms and *Nothofagus* which was widespread and shared with the other southern continents before breakup of Gondwanaland, and a younger element which arose as an injection of Malesian flora from New Guinea via Cape York Peninsula when the northward drifting Australian plate made contact with the New Guinea land mass. Added to this pattern has been the massive fluctuations in extent of rainforest due to successive waves of aridity and pluviality across the continent (Webb & Tracey, 1981; Kershaw 1975). The Torres Strait sea barrier between New Guinea and Cape York has opened and closed many times due to sea level fluctuations (Kikkawa et al, 1981). At present the environment is in a relatively dry period such that the rainforest forms a series of 'islands' along the eastern seaboard (Fig. 68).

The oldest open forest elements in the Mezirinae appear to be the open forest species of the old cosmopolitan genera *Neuroctenus (gracilis, grandis, proximus, transitus, occidentalis, woodwardi)* and *Brachyrhynchus (australis, wilsoni)* whose distributions in the southern parts of the continent, and lack of close relationships to congeneric Oriental-NG species, are symptomatic of evolution with that of Australia's sclerophyll flora. *Aspisocoris*, highly specialised and isolated in the SW, must also be an ancient element and may be derived from *Ctenoneurus*.

Australian Mezirinae show no examples of classic 'antarctic' links with South America or South Africa though any that may exist may be concealed by inadequate knowledge of the faunas of those continents. However the close superficial resemblance between the Madagascan *Robertiessa* and the South American *Emydocoris* with Australian genera needs examination in this context.

There are some rainforest groups which show connections with New Zealand and New Caledonia and probably reflect links maintained since before separation of those land masses from the Australian plate. These include the suite of 7 genera and 40 species of apterous Australian forms (*Drakiessa, Chelonoderus, Pseudoargocoris, Aegisocoris, Neophloeobia, Mesophloeobia* and *Granulaptera*) which are closely related to the New Caledonian *Phloeobia*, and probably arose from *Mezira*-like ancestors via forms equivalent to the New Zealand *Woodwardiessa*. Among macropterous genera both *Ctenoneurus* and the *tropicus-frazieri* group of *Arbanatus* are restricted to cool, upland relict areas of Australia and apparently have their nearest allies in New Caledonia rather than New Guinea.

A group of macropterous, rainforest species are very recent immigrants from the north. This immigration has been via Cape York Peninsula with no known entries via either the NW of Western Australia or the Northern Territory as commonly occur in other insect groups. There is evidence of several waves of migration, undoubtedly corresponding to openings and closings of rainforest corridors between New Guinea and Australia (Kikkawa et al, 1981). The most obvious components are (i) those taxa which entered and reached the Cairns rainforest system before the arid barrier level with Princess Charlotte Bay became operational (e.g., *Arictus thoracoceras, Neuroctenus hyalinipennis, Artabanus bilobiceps, Chinessa bispiniceps, Clavicornia usingeri*) and (ii) those taxa which entered after the formation of the arid barrier and were not able to penetrate further south than N Cape York Peninsula (e.g., *Arictus lobuliventris, Chinessa iniqua, Mezira subtriangula, Neuroctenus crassicornis*).

A group of three wing dimorphic species at Iron Range are of special note (*Scironocoris australis, Usingerida roberti* and *Caecicoris microcerus*). These enjoy the advantages of aptery in a rainforest habitat but retain dispersal ability through a facultative macropterous morph. These belong to an Indo-Pacific group which has colonised many island groups (Monteith, 1982) and are clearly very recent arrivals. Their failure to penetrate further south is probably because of competition from a diverse, already-existing, obligately-apterous fauna in the Wet Tropics Zone.

NORTH-SOUTH TRANSITION IN EASTERN AUSTRALIA. Most Australian Mezirinae are confined to the eastern states and most are also restricted to the narrow, high-rainfall belt (750mm per annum) which runs along the mountainous, eastern seaboard. Thus, in examining their distribution, we are dealing with patterns and processes within a ribbon of terrain some 4,000km long but only 200km wide, bounded to the north by Torres Strait, to the east by the Pacific Ocean, to the west by the arid inland, and interrupted in the south by Bass Strait between the mainland and Tasmania. Within this belt there are topographic discontinuities due to distribution of mountain ranges, plateaus and river valleys; there are rainfall discontinuities due to both localised topographic effects and to large scale climatic effects; and there are vegetational discontinuities, largely in the distribution of rainforest. These discontinuities are reflected in the latitudinal distribution of Mezirinae in this coastal strip and a number of barriers can be recognised between localised regions of species richness. Fig. 68B shows eastern Australia divided into 8 zones (A to H) by major distributional barriers; the zones are subdivided into regions (1-20) by lesser distributional barriers. The distribution of all mezirines within these zones and regions is summarized in Figs 69 & 70. Gradients in overall faunal size and in size of various faunal components along this latitudinal series are graphically presented in Figs 71 & 72. The nature of these regions, barriers and associated faunas will be discussed in sequence from north to south.

A. Cape York Peninsula Zone. This zone is topographically low with elevational maxima slightly exceeding 600m in the McIlwraith Range. The islands of Torres Strait comprising Region 1 are generally low, rather arid, granitic bodies subject to a long dry season in the harsh monsoonal climate. Rainforest is poorly developed but present to a limited extent on most islands. Only 4 Mezirinae are recorded, all macropterous and all subcortical, 3 of them open forest Australian endemics (*Arictus monteithi, A. obscurus* and *Neuroctenus handschini*) and 1 a non-endemic rainforest species (*N. crassicornis*). This supports the view of Kikkawa et al (1981), based on butterfly distribution, that the Torres Strait Islands have had little role in the migration of the mesic New Guinea biota into Cape York Peninsula; in fact their fauna is largely a depauperate Australian derivative. Small areas of rainforest occur at Lockerbie and Shelburne Bay in Region 2, and in larger, more luxuriant tracts at Iron Range and McIlwraith Range in Region 3. Region 2 has a depauperate fauna of 9 macropterous, subcortical species; this conforms with the belief, first expressed by Darlington (1961) on evidence from carabid beetles, and later supported by Webb & Tracey (1981) on the basis of plant dispersal mechanisms, that these rainforests disappeared during recent periods of aridity and were reconstituted by seed dispersal across open forest barriers; they received their mezirine fauna in a similar way. Region 3, by comparison, has 30 species, 29 of them present at Iron Range, making it the richest locality in Australia. Of these, 15 species are conspecific with N.G. forms and 16 do not cross Barrier 2 into the Wet Tropics Zone. Only one member of the endemic apterous complex occurs in the region, *Drakiessa wasselli*. It is isolated in its genus and is best regarded as a relict from ancient rainforest connections with the Wet Tropics Zone. The absence of a normal complement of apterous species is partly compensated for by the presence of 3 N.G. species with flightless morphs (*Caecicoris microcerus, Usingerida roberti* and *Scironocoris australis*) and 4 species of *Chinessa* which live in the same niche on dead wood as do apterous species

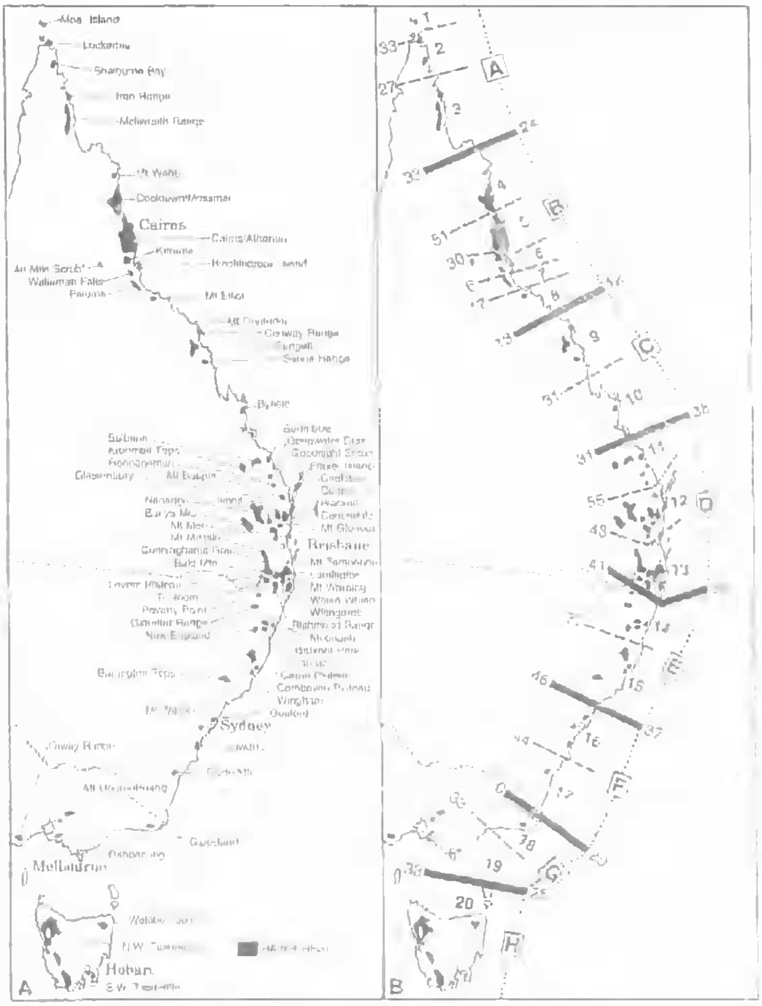

FIG 68 A, Map of eastern Australia showing distribution of rainforest as a chain of 'islands' from the tip of Cape York Peninsula in the north to Tasmania in the south. Some of the common rainforest locality names are indicated. B, The same map showing the 8 major Zones (A-H, separated by solid bars) into which the chain of rainforests has been divided for discussion in the text. These zones are further subdivided into 20 Regions (1-20, separated by dashed bars). Names of the zones and regions are given in Figs. 69, 70, 71 and 72. Complementarity values between adjacent zones are given at the right hand end of each solid bar. Those between adjacent regions are given to the left of both solid and dashed bars.

	VEGETATION AFFILIATION	BIOLOGY	FLIGHT ABILITY	ENDEMICITY	NEW GUINEA	TORRES STRAIT 1	NORTHERN PENINSULA 2	MID PENINSULA 3	COOKTOWN -MOSSMAN 4	CAIRNS-ATHERTON 5	KIRRAMA-CARDWELL 6	PALUMA RANGE 7	TOWNSVILLE -MT ELLIOT 8	PROSERPINE -EUNGELLA 9	BYFIELD-ROCKHAMPTON 10	BULBURIN-MARYBOROUGH 11	GYMPIE-BRISBANE 12	BORDER RANGES 13	NEW ENGLAND -DORRIGO 14	CARRAI-BARRINGTON 15	SYDNEY-ILLAWARRA 16	NSW SOUTH COAST 17	EAST GIPPSLAND 18	DANDENONG -OTWAYS 19	TASMANIA 20	SOUTH AUSTRALIA	SOUTHWEST AUSTRALIA	NORTHWEST AUSTRALIA	NORTHERN TERRITORY
Neuroctenus gracilis	O	S	M	E											X	X	X		X										
Neuroctenus grandis	R	S	M	E								X				X	X	X	X	X	X		X	X					
Neuroctenus proximus	O	S	M	E																							X		
Neuroctenus transitus	O	S	M	E																							X		
Neuroctenus occidentalis	O	S	M	E																							X		
Neuroctenus woodwardi	O	S	M	E						X	X			X		X	X	X	X	X	X	X			X				
Neuroctenus handschini	O	S	M	E		X	X	X	X	X			X	X														X	X
Neuroctenus kapalga	O	S	M	E																									X
Neuroctenus hyalinipennis	R	S	M	N	X		X	X	X	X																			
Neuroctenus crassicornis	R	S	M	N	X	X	X	X																					
Neuroctenus par	R	S	M	N	X		X	X	X																				
Neuroctenus eurycephalus	R	S	M	N	X			X	X																				
Neuroctenus yorkensis	O	S	M	E				X	X																				
Ctenoneurus australis	R	S	M	E					X	X	X																		
Ctenoneurus meridionalis	O	S	M	E												X	X	X	X	X	X								
Ctenoneurus robertsi	R	S	M	E					X	X																			
Aspisocoris termitophilus	O	O	B	E																							X		
Artebanus sinuatus	R	O	M	N	X			X																					
Artabanus bilobiceps	R	O	M	N	X			X	X	X																			
Caecicoris microcerus	R	O	M/B	N	X			X																					
Scironocoris australis	R	O	M/B	E				X																					
Usingerida roberti	R	O	M/B	N	X			X																					
Chinessa bispiniceps	R	O	M	N	X			X	X	X																			
Chinessa claudiae	R	O	M	E				X																					
Chinessa pusilla	R	O	M	E				X																					
Chinessa iniqua	R	O	M	N	X			X																					
Clavicomia usingeri	R	O	M	N	X			X	X	X	X																		
Chiastoplonia minuta	R	O	M	E					X	X	X			X			X	X			X								
Chiastoplonia barnaga	R	O	M	E			X	X																					
Chiastoplonia granulata	R	O	M	E				X	X	X	X																		
Chiastoplonia thoracica	R	O	M	E				X																					
Chiastoplonia pygmaea	R	O	M	N				X																					
Corynophloeobia dimorpha	O	O	M	E																	X								
Glochocoris monteithi	R	O	M	E										X			X	X	X	X	X	X							
Glochocoris abdominalis	R	O	M	E					X	X	X																		
Glochocoris brisbanicus	O	O	M	E										X	X		X	X		X									
Glochocoris gippslandicus	O	O	M	E																			X						
Arbanatus peninsularis	R	S	M	E				X																					
Arbanatus tropicus	R	S	M	E				X	X	X																			
Arbanatus frazieri	O	S	M	E															X	X									
Arictus monteithi	O	S	M	E		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X							
Arictus tasmani	O	S	M	E												X	X	X											
Arictus dimidiatus	O	S	M	E											X														
Arictus thoracoceras	R	S	M	N	X			X	X																				
Arictus obscurus	O	S	M	E		X		X																					

FIG. 69. Table summarising distribution and biology of the first 45 species of Australian Mezirinae in taxonomic sequence. Presence of each species in the series of geographic zones is indicated by the solid bar. Entries for the other columns are as follows: Endemicity, E=species restricted to Australia, N=species also occurring elsewhere; Vegetation, R=species occurring in rainforest, O=open forest species; Flight Ability, M=macropterous (winged) species, A=apterous (wingless) species, B=brachypterous (short-winged) species, M/B=wing dimorphic species; Biology, S=species occurring under bark, O, species occurring in other situations.

B. Wet Tropics Zone. This zone has extensive rainforests overlaying a complex, mountainous topography including the highest mountains in N Australia. With 42 species it has the most diverse fauna but due to considerable allopatric speciation no localised part has a fauna as rich as Iron Range. The Zone is limited to the north by the arid corridor at Princess Charlotte Bay, and to the south by an arid corridor south of Townsville caused by lack of coastal mountains. These are the two most potent barriers in eastern Australia; of the Wet Tropics Zone's 42 Mezirinae, 26 do not cross the Barrier to the north and 32 do not cross the Barrier to the south. The faunistic foci of the Zone lie in Regions 5 (Mossman-Mt Lewis-Cooktown: 27 species) and 6 (Cairns-Atherton: 26 species) and there is rapid decrease in the numbers of species in the various isolated rainforest mountains (Regions 6-8) in the southern sector. Each of these regions has local endemic species (e.g., *Mesophloeobia kirrama* and *Neophloeobia cataracta* at 6; *Neophloeobia paluma* at 7; *Drakiessa virago* at 8) and this is symptomatic of the past waxing and waning of rainforest in NE Queensland described by Kershaw (1975) from palynological studies. Region 7 (Paluma Range), despite intensive collecting, is extraordinary in having only a single rainforest mezirine species, evidence, perhaps, that rainforest there was completely lost in the past.

The overall fauna of this Zone has two prominent elements: (i) a great number of apterous species including 2 genera locally endemic

	VEGETATION AFFILIATION	BIOLOGY	FLIGHT ABILITY	ENDEMICITY	NEW GUINEA	1 TORRES STRAIT	2 NORTHERN PENINSULA	3 MID PENINSULA	4 COOKTOWN -MOSSMAN	5 CAIRNS-ATHERTON	6 KIRRAMA-CARDWELL	7 PALUMA RANGE	8 TOWNSVILLE -MT ELLIOT	9 PROSERPINE -EUNGELLA	10 BYFIELD-ROCKHAMPTON	11 BULBURIN-MARYBOROUGH	12 GYMPIE-BRISBANE	13 BORDER RANGES	14 NEW ENGLAND -DORRIGO	15 CARRAI-BARRINGTON	16 SYDNEY-ILLAWARRA	17 NSW SOUTH COAST	18 EAST GIPPSLAND	19 DANDENONG -OTWAYS	20 TASMANIA	SOUTH AUSTRALIA	SOUTHWEST AUSTRALIA	NORTHWEST AUSTRALIA	NORTHERN TERRITORY
Arictus lobuliventris	R	S	M	N	—			—																					
Brachyrhynchus sulcatus	R	S	M	N	—		—	—	—	—					—	—													
Brachyrhynchus subtriangulus	R	S	M	N	—		—	—																					
Brachyrhynchus elegans	O	S	M	E															—										
Brachyrhynchus australis	O	S	M	E				—	—	—		—		—	—	—	—	—	—	—	—	—					—		—
Brachyrhynchus wilsoni	O	S	M	E										—	—	—	—	—	—			—		—	—			—	
Drakiessa hackeri	O	O	A	E												—	—	—											
Drakiessa cantrelli	R	O	A	E														—											
Drakiessa glaebula	R	O	A	E						—																			
Drakiessa parva	R	O	A	E														—											
Drakiessa consobrina	R	O	A	E														—	—	—									
Drakiessa tertia	R	O	A	E													—	—											
Drakiessa planula	R	O	A	E						—																			
Drakiessa minor	R	O	A	E										—	—	—	—												
Drakiessa confusa	R	O	A	E													—												
Drakiessa wasselli	R	O	A	E				—																					
Drakiessa virago	R	O	A	E									—																
Drakiessa sybilae	R	O	A	E										—															
Drakiessa arelimira	R	O	A	E										—															
Drakiessa sp (nymph)	R	O	A	E					—																				
Chelonoderus stylatus	R	O	A	E					—	—																			
Chelonoderus forfex	R	O	A	E						—																			
Chelonoderus thompsoni	R	O	A	E							—																		
Chelonoderus minor	R	O	A	E						—																			
Pseudoargocoris grossi	R	O	A	E										—															
Aegisocoris granulatus	R	O	A	E						—																			
Aegisocoris kormilevi	R	O	A	E					—																				
Neophloeobia montrouzieri	R	O	A	E															—	—									
Neophloeobia australiensis	R	O	A	E														—											
Neophloeobia mirabilis	R	O	A	E													—												
Neophloeobia bulburina	R	O	A	E												—													
Neophloeobia incisa	R	O	A	E										—															
Neophloeobia paluma	R	O	A	E								—																	
Neophloeobia cataracta	R	O	A	E							—																		
Neophloeobia elongata	R	O	A	E					—	—																			
Mesophloeobia vetusta	R	O	A	E														—	—	—									
Neophloeobia australica	R	O	A	E							—			—		—		—											
Mesophloeobia kirrama	R	O	A	E							—																		
Neophloeobia yeatesi	R	O	A	E					—																				
Granulaptera tuberculata	R	O	A	E						—	—																		
Granulaptera verrucosa	R	O	A	E					—																				
Granulaptera ovata	R	O	A	E						—																			
Granulaptera remota	R	O	A	E												—													
Granulaptera alticola	R	O	A	E					—	—																			
Granulaptera cooki	R	O	A	E					—																				
Granulaptera spiniceps	R	O	A	E					—	—	—																		

FIG. 70. Table summarising distribution and biology of remaining 46 species of Australian Mezirinae in taxonomic sequence. Details as in Fig. 69.

(*Chelonoderus* and *Aegisocoris*) and 1 (*Granulaptera*) virtually so; each has undergone radiation within the region; and (ii) a group of 8 New Guinea species (e.g., *Artabanus bilobiceps, Chinessa bispiniceps, Arictus thoracoceras*) which have their southern limits within the zone; only one non-endemic species (*Brachyrhynchus sulcatus*) is found south of the Wet Tropics.

C. Central Queensland Zone. In this zone the Great Dividing Range is displaced far inland so that rainfall sufficient for rainforest development occurs only where subcoastal mountains are developed. This occurs significantly on the high Eungella Range and associated coastal areas in Region 9, and to a lesser extent near Byfield in Region 10. Although the Zone has a small fauna of only 16 species there are some striking local endemics (*Drakiessa sybilae, D. arelimira, Pseudoargocoris grossi* and *Neophloeobia incisa*) all of which are confined to Region 9. In keeping with the paucity of rainforest the overall fauna shows a low proportion of apterous species (4) and a high proportion of subcortical species (6).

D. Southern Queensland Zone. This is a large, diverse zone with a rich fauna of 25 species of Mezirinae. The topographic framework consists of a series of subcoastal ranges (Dawes Range and Kroombit Tops in Region 11; Jimna, Blackall, Bunya and D'Aguilar Ranges in Region 12; Mt Tamborine, Main Range, MacPherson Range and Mt Warning complex in Region 13). Rainforest is developed to a variable extent on all mountain systems but its quality is in accord with local rainfall which ranges in a gradient from low in Region 11 to high in 13. Region 11 has the smallest mezirine total of 12 species but these include an important focus of relict apterous species in the isolated rainforests of the Dawes

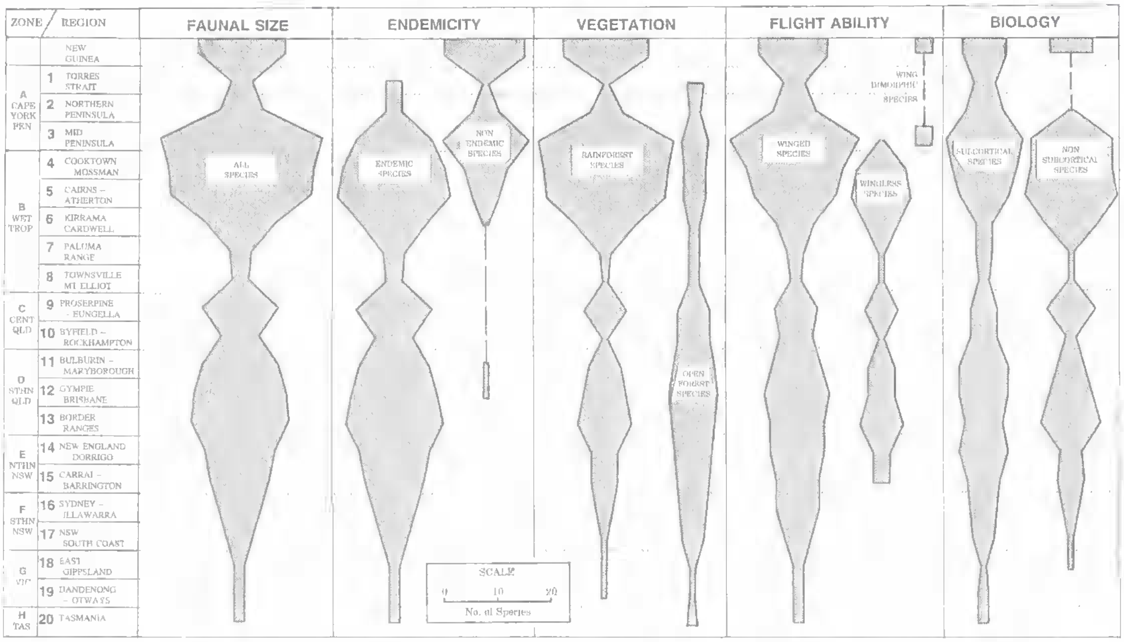

FIG. 71. Gradient in species number of various faunal components of Mezirinae through the north/south series of Regions of eastern Australia as indicated in Fig. 68B. Widths indicate relative number of species of each component in each region. Values for New Guinea indicate only N.G. species which are shared with Australia.

Range (Bulburin State Forest); these are *Granulaptera remota*, the only member of its genus to occur south of the Wet Tropics, plus *Drakiessa minor* and *Mesophloeobia australica*, both uncommon species known from highly disjunct localities. Regions 12 and 13 each have diverse, contrasting faunas, which are separated by the distributional barrier of the Brisbane River Valley. Within these regions there has been a radiation of 5 species of the apterous genus *Drakiessa*, 4 of which are virtually sympatric in the southern half of Region 12. Region 13 is based on the ring of mountain ranges which form the eroded remnants of the former giant shield volcano based on Mt Warning. This once continuous massif was an evolutionary centre for apterous Aradidae and 8 wingless Mezirinae are now found on its dissected fragments.

E. Northern New South Wales Zone. The mountain backbone of the Great Dividing Range is here thrown into a number of high, cool plateaus with temperate rainforest (Ebor/Dorrigo: Region 14; Carrai Plateau and Barrington Tops: Region 15). The overall region has 14 species, a little more than half the total for S Queensland, and this heralds the beginning of a rapid decline in species richness with increasing latitude in E Australia. This is reflected in the region totals, from N to S, of 13 and 11 species respectively. This is due a great deal to the decline of apterous species, none of which occur S of Barrington Tops.

F. Southern New South Wales Zone. With mountains formed by the Great Dividing Range this region has a few fragments of rainforest which support only the widespread, minute, macropterous species, *Chiastoplonia minuta* and *Glochocoris monteithi*. The overall total of 9 species for the zone includes the curious endemic *Corynophloeobia dimorpha* and otherwise only species of the old, cosmopolitan genera *Arictus, Neuroctenus, Ctenoneurus* and *Brachyrhynchus*.

G. Victoria. Although this region has fragments of subtropical rainforest in E Gippsland (Region 19) and rather extensive temperate rainforests on both the Great Divide and the Otway Ranges of Region 20 it has no obligatory rainforest species. Only one species, *Brachyrhynchus wilsoni* inhabits the higher parts of the Australian Alps.

H. Tasmania. The fact that the diverse environment of Tasmania is inhabited by only two Mezirinae (*Brachyrhynchus wilsoni* and *Neuroctenus woodwardi*), both of them macropterous species shared with the mainland, suggests that if the island ever did have a richer fauna comparable with that found in similar environments of

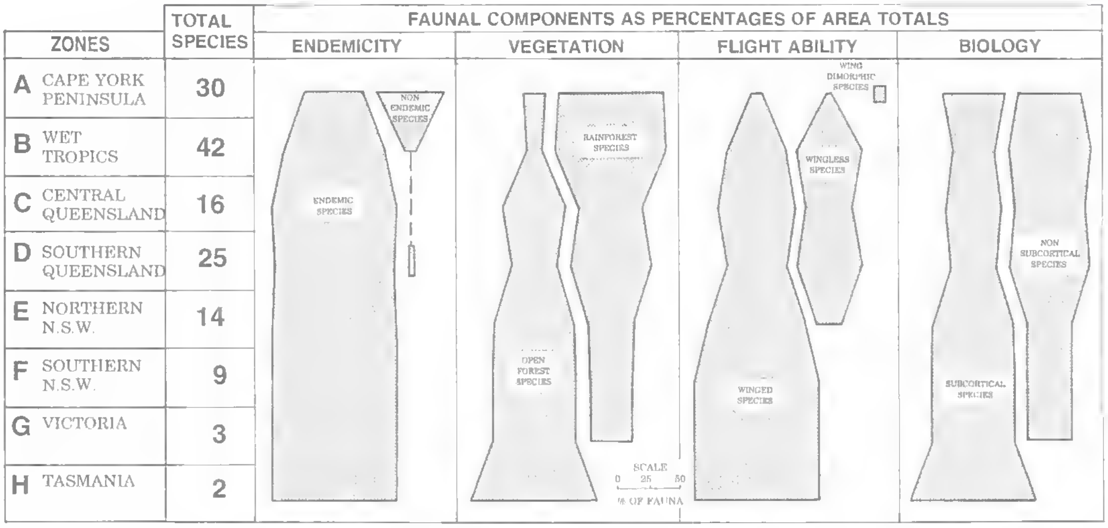

FIG. 72. Gradients in the relative size of faunal components of Mezirinae from north to south in the eastern Australian zones as shown in Fig. 68B. Widths of bars represent percentage of species in each zone which fall in each category. The first column gives total species number for each zone.

New Zealand, then it became extinct during the Pleistocene glaciations.

COMPLEMENTARITY VALUES FOR BARRIERS. To give comparative values for the barriers between the zones and regions (Fig. 68B) a simple calculation of complementarity (percentage similarity) for each pair of adjacent areas was carried out as described by Colwell & Coddington (1994). The formula is:

No. of shared species ÷ Total species occurring at one or both sites $\times 100\%$

In Fig. 68B the complementarity values between zones and between individual regions are shown. The lower the value the more powerful the barrier is to dispersal between adjacent areas. At a zonal level the barrier between B and C is most marked with only 12% similarity between the faunas on each side of the arid corridor to the south of the Wet Tropics. The barrier to the north of the Wet Tropics is also very strong with only 24% similarity. Most notable among the regional barriers is that between Cardwell and the Paluma Range with only 6% similarity, due to the very small fauna at Paluma.

TRANSITION IN FAUNAL COMPONENTS. The tables in Figs 69 and 70 give entries for 4 characteristics of each species: Endemicity — whether the species is endemic to Australia or also occurs elsewhere; Vegetation Affiliation — whether the species occurs in rainforest or open forest; Flight Ability — whether species are macropterous, apterous, brachypterous or wing dimorphic; Biology — whether species live under bark (sub-cortical) or elsewhere. The total fauna of Mezirinae in a particular area can be divided into faunal components on the basis of these characteristics. The N-S transition in proportions of these components is graphically shown for the 20 regions (Fig. 71) and the 8 zones (Fig. 72). Figure 71 shows actual numbers of species while Fig. 72 shows the values as percentage of each zone fauna. Among other points these diagrams illustrate: faunal maxima occurring in N, Central and S Queensland are result of peaks of rainforest species in those areas; these rainforest species are largely apterous species in the Wet Tropics and S Queensland but in Cape York they comprise a large group of non-endemic winged species.

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LITERATURE CITED

BERGROTH, E. 1886. Zur Kenntniss der Aradiden. Verhandlungen der Zoologisch-Botanischen Gesellschaft in Wien 36: 53-60.

1887. Synopsis of the genus *Neuroctenus*. Ofversigt af Finska Vetenskaps - Societetens Förhandligar 29: 173-189.

1889. Commentarius de Aradidis in Burma et Tenasserim a L. Fea collectis. Annali del Museo civico di storia naturale di Genova 7: 730-739.

1892a. Commentarius secundus de Aradidi in Burma et Tenasserim a L. Fea collectis. Annali del Museo civico di storia naturale di Genova 12: 710-717.

1892b. Aradidi dell'isola di Engano raccolti dal Dott. Elio Modigliani. Annali del Museo civico di storia naturale di Genova 12: 806-808.

BLÖTE, H.C. 1965. Catalogue of the Aradidae in the Rijksmuseum van Natuurlijke Historie. Zoologische Verhandelingen 75: 1-41.

BOISDUVAL, J.B.A. 1835. Faune entomologique de l'ocean Pacifique avec l'illustration des insectes nouveaux pendant le voyage, pages 609-622 and plate 10 in Voyage de decouvertes d l'Astrolabe execute par ordre du Roi, pendant les annees 1826-1827-1828-1829 sous le commandement de M.J. Dumout d'Urville 2: I-VIII, 1-716, plates 1-12.

BRASS, L.J. 1953. Results of the Archbold Expeditions. No. 68. Summary of the 1948 Cape York (Australia) Expedition. Bulletin of the American Museum of Natural History 102: 1-205.

CARAYON, J. 1955. Quelques caracteres anatomiques des Hémiptères Aradides. Revue Française d'Entomologie 22: 169-180.

CHINA, W.E. 1930. 'Insects of Samoa'. Part II. Hemiptera-Heteroptera. British Museum, London 3: 81-162.

COBBEN, R.H. 1968. 'Evolutionary trends in Heteroptera. Part I. Eggs, architecture of the shell, gross embryology and eclosion'. (Centre for Agricultural Publishing and Documentation, Wageningen).

1978. 'Evolutionary trends in Heteroptera. Part II. Mouthpart structures and feeding strategies'. Mededelingen van de Landbouwhoogeschool te Wageningen 78-5: 1-407.

COLWELL, R.K. & CODDINGTON, J.A. 1994. Estimating terrestrial biodiversity through extrapolation. Philosophical Transactions of the Royal Society of London (B) 345: 101-118.

DARLINGTON, P.J. 1960. Australian carabid beetles IV. List of localities, 1956-1958. Psyche 67: 112-126.

1961. Australian carabid beetles. V. Transition of wet forest faunas from New Guinea to Tasmania. Psyche 68: 1-24.

DISTANT, W.L. 1902. Rhynchotal Notes. XIII. Heteroptera: Families Tingidae, Phymatidae and Aradidae. Annals and Magazine of Natural History (7)9: 358-362.

DRAKE, C.J. 1942. A new apterous aradid from Australia. Pan-Pacific Entomologist 18: 190-191.

ESAKI, T. & MATSUDA, R. 1952. Description of a new genus and species of Dysodiidae from Formosa (Hemiptera). Mushi 23: 65-67.

1957. Hemiptera Micronesica, III. Dysodiidae. Mushi 22: 73-86.

FIEBER, F.X. 1861. 'Die europäischen Hemiptera' Vienna, pp. 1-444.

FLETCHER, J.J. 1929. The Society's heritage from the Macleays. Part II. Proceedings of the Linnean Society of New South Wales 54: 185-272.

GAY, F.J. 1974. The Australian termite genus *Occasitermes* (Isoptera: Termitidae: Nasutitermitinae). Journal of the Australian Entomological Society 13: 275-283.

GOEL, S.C. 1970. Notes on the structure of the unguitractor plate in Heteroptera (Hemiptera). Journal of Entomology (A) 46: 167-173.

GOEL, S.C. & SCHAEFER, C.W. 1970. The structure of the pulvillus and its taxonomic value in the land Heteroptera (Hemiptera). Annals of the Entomological Society of America 63: 307-313.

HEISS, E. 1982a. New and little known Aradidae from India in the Museum d'Histoire naturelle de Genève (Heteroptera). Revue Suisse de Zoologie 89: 245-267.

1982b. New Aradidae from Andaman Islands, northern India and Java (Heteroptera). Bolletino del Museo Civico di Storia Naturale di Verona 8: 185-204.

1988. Taxonomische Probleme durch Variation bei Heteropteren. Symposion über Fragen zur Systematik und Evolution der Insekten. Universität Passau. Pp. 65-73.

1989a. A new genus and two new species of micropterous Mezirinae from Sabah (Heteroptera, Aradidae). Entomofauna 10(1): 1-13.

1989b. Types of Aradidae in the Museo Civico di Storia Naturale 'Giacomo Doria' Genova I. Annali del Museo Civico di Storia Naturale di Genova 87: 327-371.

1990. A review of the genus *Dysodius* Lepeletier & Serville, 1828, with descriptions of two new species (Heteroptera, Aradidae). Annals Instituto Biologica UNAM, Series Zoologica 61(2): 279-295).

HEISS, E. & HOBERLANDT, L. 1985. Aradidae (Hemiptera, Heteroptera) von Sri Lanka. Entomologica Scandinavica, Supplement 30: 31-35.

HENDEE, E.C. 1933. Association of the termites, *Kalotermes minor*, *Reticulitermes hesperus* and *Zootermopsis angusticollis* with fungi. University of California Publications in Zoology 39: 111-134.

HOBERLANDT, L. 1963. Additional notes on Aradidae from Madagascar and adjacent islands (Heteroptera). Acta Entomologica Musei Nationalis Pragae 35: 127-170.

1967. *Aradidae* (Hemiptera Heteroptera). Parc National de l'Upemba. Mission G.F. de Witte. Fasc. 70(2): 11-21.

HSIAO, Tsai-Yu 1964. Results of the Zoologico-botanical expedition to southwest China 1955-1957 (Hemiptera-Aradidae). Acta Entomologica Sinca 13: 587-605.

JACOBS, D.H. 1980. Evolution and relationships in the Aradidae (Heteroptera). Proceedings of the 3rd Entomological Congress, Pretoria 3: 2-3.

1986. Morphology and taxonomy of sub-saharan *Aneurus* species with notes on their phylogeny, biology and cytogenetics (Heteroptera: Aradidae: Aneurinae). Entomology Memoir, Department of Agriculture and Water Supply, Republic of South Africa 64: 1-45.

KERSHAW, A.P. 1975. Late quarternary vegetation and climate in north-eastern Australia. Bulletin of the Royal Society of New Zealand 13: 181-188.

KIKKAWA, J., MONTEITH, G.B. & INGRAM, G. 1981. Cape York Peninsula: the major region of faunal interchange. Pp. 1697-1742. In A. Keast (ed.) 'Ecological Biogeography in Australia'. (Junk: The Hague).

KIRITSHENKO, A.N. 1959. Novye I Maloizvestnye Brachyrhynchidae (Hemiptera-Heteroptera). Entomologischeskoe Obozrenie 38: 179-195.

KORMILEV, N.A. 1953. Notes on Aradidae from the Eastern Hemisphere (Hemiptera). Verhandlungen der Naturforschenden Gesellschaft in Basel 64: 333-346.

1955a. Notes on Aradidae from the Eastern Hemisphere VIII (Hemiptera). Aradidae from the Oriental Region VI. Verhandlungen der Naturforschenden Gesellschaft in Basel 66: 141-146.

1955b. Notes on Aradidae from the Eastern Hemisphere, IV (Hemiptera-Heteroptera). Aradidae from the Oriental and Australian Regions 2. Annals and Magazine of Natural History (12)8: 194-203.

1955c. Notes on Aradidae from the Eastern Hemisphere (Hemiptera). VII. Aradidae from Fukien, South China. Quarterly Journal of the Taiwan Museum 8: 177-191.

1955d. Notes on Aradidae from the Eastern Hemisphere, VI (Hemiptera) Aradidae from the Oriental and Australian Regions IV. Revista Ecuatoriana de Entomoligía y Parasitología 2: 485-508.

1957a. Notes on Aradidae from the Eastern Hemisphere XI (Hemiptera). On some apterous Mezirinae from New Guinea. Philippine Journal of Science 85: 389-403.

1957b. Notes on Aradidae from the Eastern Hemisphere (Hemiptera). XIII. On some Aradidae in the Drake Collection. Quarterly Journal of the Taiwan Museum 10: 37-46.

1957c. Notes on Aradidae from the Eastern Hemisphere XIV (Hemiptera). Aradidae from the Oriental and Australian Regions IX. Annals and Magazine of Natural History 12(10): 265-273.

1958. Notes on Aradidae from the Eastern Hemisphere XV (Hemiptera). Journal of the New York Entomological Society 66: 87-97.

1960. Notes on Aradidae from the Eastern Hemisphere XVII. (Hemiptera). Quarterly Journal of the Taiwan Museum 13: 163-174.

1963. Notes on Aradidae in the Naturhistoriska Riksmuseum, Stockholm (Hemiptera-Heteroptera). Arkiv för Zoologi 15: 443-455.

1964. New genera and species of Queensland Aradidae (Hemiptera: Heteroptera). Journal of the Entomological Society of Queensland 3: 42-47.

1965a. Notes on Australian Aradidae (Hemiptera: Heteroptera) with descriptions of new genera and species. Proceedings of the Royal Society of Queensland 77: 11-35.

1965b. Notes on Aradidae in the Naturhistoriska Riksmuseum, Stockholm. Hemiptera-Heteroptera. Arkiv för Zoologi 18: 1-8.

1966. Aradidae in the South Australian Museum, Adelaide (Hemiptera-Heteroptera). Records of the South Australian Museum 15: 275-307.

1967a. Aradidae in the South Australian Museum, Adelaide II (Hemiptera-Heteroptera). Records of the South Australian Museum 15: 513-550.

1967b. Notes on Aradidae from the Eastern Hemisphere XX. Eos 42: 467-491.

1967c. Some Aradidae (Hemiptera-Heteroptera) from the Philippine, Bismarck and Solomon Islands. Entomologiske Meddelelser 35: 291-300.

1967d. Notes on Australian Aradidae (Hemiptera: Heteroptera) with descriptions of new species of *Calisius* Stål and *Glochocoris* Usinger & Matsuda. Proceedings of the Royal Society of Queensland 79: 71-78.

1968. Notes on Aradidae from the Eastern Hemisphere, XXI. Aradidae in the Field Museum of Natural History, Chicago, Illinois, (Hemiptera: Heteroptera). Quarterly Journal of the Taiwan Museum 21: 225-233.

1969. Aradidae in the Bishop Museum, Honolulu IV. (Hemiptera-Heteroptera). Pacific Insects 11(1): 49-70.

1971. Mezirinae of the Oriental Region and South Pacific (Hemiptera-Heteroptera: Aradidae). Pacific Insects Monograph 26: 1-165.

1972. Mezirinae of the Oriental Region and South Pacific, Supplement (Hemiptera-Heteroptera: Aradidae). Pacific Insects 14: 571-583.

1974. Aradidae from the tropical Africa and Madagascar in the Museum National d'Histoire Naturelle, Paris (Hem. Heteroptera). Annales de la Société Entomologique de France (N.S.) 10: 59-77.

1976a. Notes on Aradidae from China and India (Hemiptera-Heteroptera). Pacific Insects 17: 87-90.

1976b. A new species of *Neuroctenus* from the nests of termites (Hemiptera: Aradidae). Sociobiology 7: 25-28.

1977. A new species of the genus *Overlaetiella* Schouteden from Sumatra. Proceedings of the Entomological Society of Washington 79: 354-357.

1978. On some Aradidae from the Oriental and Australian regions (Hemiptera). Philippine Journal of Science 105: 235-254.

1980a. Homonymy in the Aradidae (Hemiptera). Pacific Insects 22: 328.

1980b. A new species of the genus *Daulocoris* Usinger and Matsuda, 1959, from Sumatra (Hemiptera: Aradidae). Sociobiology 5(1): 21-24.

1982. A new species of *Neuroctenus* from nests of termites (Hemiptera: Aradidae). Sociobiology 7(1): 25-28.

1983. New oriental aradid bugs in the collections of the British Museum (Natural History) (Insecta: Hemiptera). Journal of Natural History 17: 437-469.

1984. A new species of the genus *Chinessa* Usinger and Matsuda, 1959, from Papua New Guinea (Hemiptera: Aradidae). Pan-Pacific Entomologist 60(2): 76-78.

1986. Two new genera and seven new species of Aradidae (Hemiptera). Journal of the New York Entomological Society 94: 249-261.

1992. A new homonym in the Mezirinae (Hemiptera: Aradidae). Journal of the New York Entomological Society 100(1): 184.

KORMILEV, N.A. & HEISS, E. 1973. On some Aradidae (Hemiptera: Heteroptera) from Nepal and Thailand. Berichte des naturwissenschaftlich-medizinischen Vereins in Innsbruck 60: 61-77.

KORMILEV, N.A. & FROESCHNER, R.C. 1987. Flat bugs of the world: a synonymic list (Heteroptera: Aradidae). Entomography 5: 1-246.

KUMAR, R. 1967. Morphology of the reproductive and alimentary systems of the Aradoidea (Hemiptera), with comments on relationships within the superfamily. Annals of the Entomological Society of America 60: 17-25.

LAPORTE, F.L. de 1832. Essai d'une classification systematique de l'ordre des Hemipteres. Magazin Zoologie Guerin 2: 17-88.

LEE, C.E. & PENDERGRAST, J.G. 1976. A comparative study of the stylets in the Aradidae (Hemiptera: Heteroptera). Journal of Natural History 10: 489-496.

1977. The Aradidae of New Zealand (Hemiptera: Heteroptera) IV. The Mezirinae, with a consideration of the genitalia. New Zealand Journal of Zoology 4: 167-175.

1983. The spermathecae of New Zealand Aradidae (Hemiptera: Heteroptera). Journal of Natural History 17: 113-122.

LESTON, D. 1955. Remarks on the male and female genitalia and abdomen of Aradidae. Proceedings of the Royal Entomological Society of London (A)30: 63-69.

LETHIERRY, L. 1888. Liste des Hemipteres recueillis à Sumatra et dans l'île Nias par M.E. Modigliani. Annali de Museo Civico di Storia Naturali di Genova 6: 464.

LETHIERRY, L. & SEVERIN, G. 1896. Catalogue général des Hémiptères 3: 31-49. (Berlin).

LIU, S.-L. 1980. New species of Mezirinae from China (Hemiptera: Heteroptera: Aradidae). Acta Zootaxonomica Sinica 5: 174-184.

MATSUDA, R. 1976. 'Morphology and Evolution of the Insect Abdomen'. (Pergamon, Toronto).

MATSUDA, R. & USINGER, R.L. 1957. Heteroptera: Aradidae. Insects of Micronesia 7: 117-172.

MAYR, G.L. 1866. Diagnosen neuer Hemipteren. III. Verhandlungen der Zoologisch-Botanischen Gesellschaft in Wien 16: 361-366.

MILLER, N.C.E. 1938. A new subfamily of Malaysian Dysodiidae (Rhynchota). Annals and Magazine of Natural History. (11)1: 498-510.

MONTEITH, G.B. 1966. A new genus of Chinamyersiinae (Heteroptera: Aradidae) from Australia, with notes on its relationships and male genitalia. Journal of the Entomological Society of Queensland 5: 46-50.

1967. A revision and redescription of the genus *Glyptoaptera* Kormilev (Hemiptera: Aradidae). Proceedings of the Royal Entomological Society of London (B)36: 50-60.

1968. Notes on Aradidae from Fraser Island. Queensland Naturalist 19: 46.

1969. A remarkable case of alary dimorphism in the Aradidae (Hemiptera) with a generic synonymy and a new species. Journal of the Australian Entomological Society 8: 87-94.

1980. Relationships of the genera of Chinamyersiinae, with description of a relict species from mountains of North Queensland (Hemiptera: Heteroptera: Aradidae). Pacific Insects 4: 275-285.

1982. Biogeography of the New Guinea Aradidae (Heteroptera). Pp. 645-657. In Gressitt, J.L. (ed.) Biogeography and ecology of New Guinea. (Junk: The Hague).

1985. Altitudinal transect studies at Cape Tribulation, North Queensland. I. Introduction and Summary. Queensland Naturalist 26: 40-48.

MONTROUZIER, P. 1865. Essai sur la faune entomologique de Kanala (Nouvelle-Caledonie). Annales de la Société Linnéene de Lyon 11: 235-236.

MUSGRAVE, A. 1932. 'Bibliography of Australian Entomology 1775-1930'. (Royal Zoological Society of New South Wales: Sydney).

MYERS, J.G. & CHINA, W.E. 1928. A remarkable new genus and two species of Aradidae from New Zealand. Annals and Magazine of Natural History 9: 366-372.

PENDERGRAST, J.G. 1957. Studies on the reproductive organs of the Heteroptera with a consideration of their bearing on classification. Transactions of the Royal Entomological Society of London 109: 1-63.

PICCHI, V. 1977. A systematic review of the genus *Aneurus* of North and Middle America and the West Indies (Hemiptera: Aradidae). Quaestiones Entomologicae 13: 255-308.

SCHAEFER, C.W. 1977. Genital capsule of the trichophoran male (Hemiptera: Heteroptera: Geocorisae). International Journal of Insect Morphology and Embryology 6: 277-301.

SCHUH, R.T. 1976. Pretarsal structure in the Miridae (Hemiptera) with a cladistic analysis of relationships within the family. American Museum Novitates No. 2601: 1-39.

SHERBORN, C.D. 1934. Dates of publication of catalogues of natural history (post 1850) issued by the British Museum. Annals and Magazine of Natural History 13: 308-312.

SIGNORET, V. 1880. De quelques genres nouveaux et espèces nouvelles de l'ordre des Hémiptères faisont partie de la collection du Musée Civique de Genes. Annali del Museo Civico di Storia Naturale di Genova 15: 540-541.

STÅL, C. 1865. Hemiptera Africana. (Stockholm) 3: 1-200.

1870. Hemiptera insularum Philippinarum Bidrag till Philippinksa oarnes Hemiptera-fauna.Ofv. Kungliga Veternskapsakademiens Förhandlingar 27: 607-776.

1873. Enumeratio Hemipterorum. Enumeratio Aradidarum Extraeuropaearum. Kungliga Svenska Vetenskapsakademiens Handlingar 11: 135-147.

ŠTYS, P. 1974. Morphological and taxonomic notes on the Aneurinae, with descriptions of *Aneurus* (*Iralunelus* subgen. n.) *gallicus* sp. n. from France, and a world list of species (Heteroptera, Aradidae). Acta Entomologica Bohemoslovaca 71: 86-104.

USINGER, R.L. 1936. Studies in the American Aradidae with descriptions of new species. Annals of the Entomological Society of America 29: 490-516.

1941. Three new genera of apterous Aradidae. Pan-Pacific Entomologist 17: 169-181.

1950. The origin and distribution of the apterous Aradidae. Proceedings of the 8th International Congress of Entomology. Stockholm pp. 174-179.

1954. A new genus of Aradidae from the Belgian Congo, with notes on stridulatory mechanisms in the family. Annales du Musée Royale du Congo Belge 1: 540-543.

USINGER, R.L. & MATSUDA, R. 1959. 'Classification of the Aradidae (Hemiptera-Heteroptera)'. (British Museum (Natural History): London).

VÁSÁRHELYI, T. 1976. *Chinessa furcella* sp.n. from New Guinea (Heteroptera, Aradidae). Annales Historico-Naturales Musei Nationalis Hungarici 68: 69-70.

1985. On *Chinessa furcella* and the genus *Melveries* (Heteroptera: Aradidae). Folia Entomologica Hungarica 46: 173-177.

1986. The pretarsus in Aradidae. Acta Zoologica Hungarica 32(3-4): 377-383.

1987. On the relationships of the eight aradid subfamilies (Heteropera). Acta Zoologica Hungarica 33(1-2): 263-267.

WALKER, F. 1873. Catalogue of the specimens of Hemiptera Heteroptera in the collection of the British Museum. Part VIII. pp. 6-44. (British Museum: London).

WALKER, J.J. 1894. A visit to Damma Island, East Indian Archipelago. Annals and Magazine of Natural History 6(14): 49-56.

1905. Antipodean field notes III. A sketch of the entomology of Sydney, N.S.W.. Entomologists Monthly Magazine 41: 216-220, 227-233.

WEBB, L.J. & TRACEY, J.G. 1981. Australian rainforests: patterns and change. Pp. 605-694. In Keast, A. (ed.) Ecological Biogeography of Australia. (Junk: The Hague).

WYGODZINSKY, P. 1948. Studies on some apterous Aradidae from Brazil (Hemiptera). Boletim do Museu Nacional de Rio de Janeiro, New Series, Zoologica 86: 1-23